Vol. 17, No. 8 AUGUST, 1940

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Published Monthly by the AMERICAN JOURNAL OF OPTOMETRY PUBLISHING ASSOCIATION,
1501 Foshay Tower, 821 Marquette Ave., Minneapolis, Minn.

ANNUAL SUBSCRIPTION $4.00 CANADA $4.50, FOREIGN $5.00
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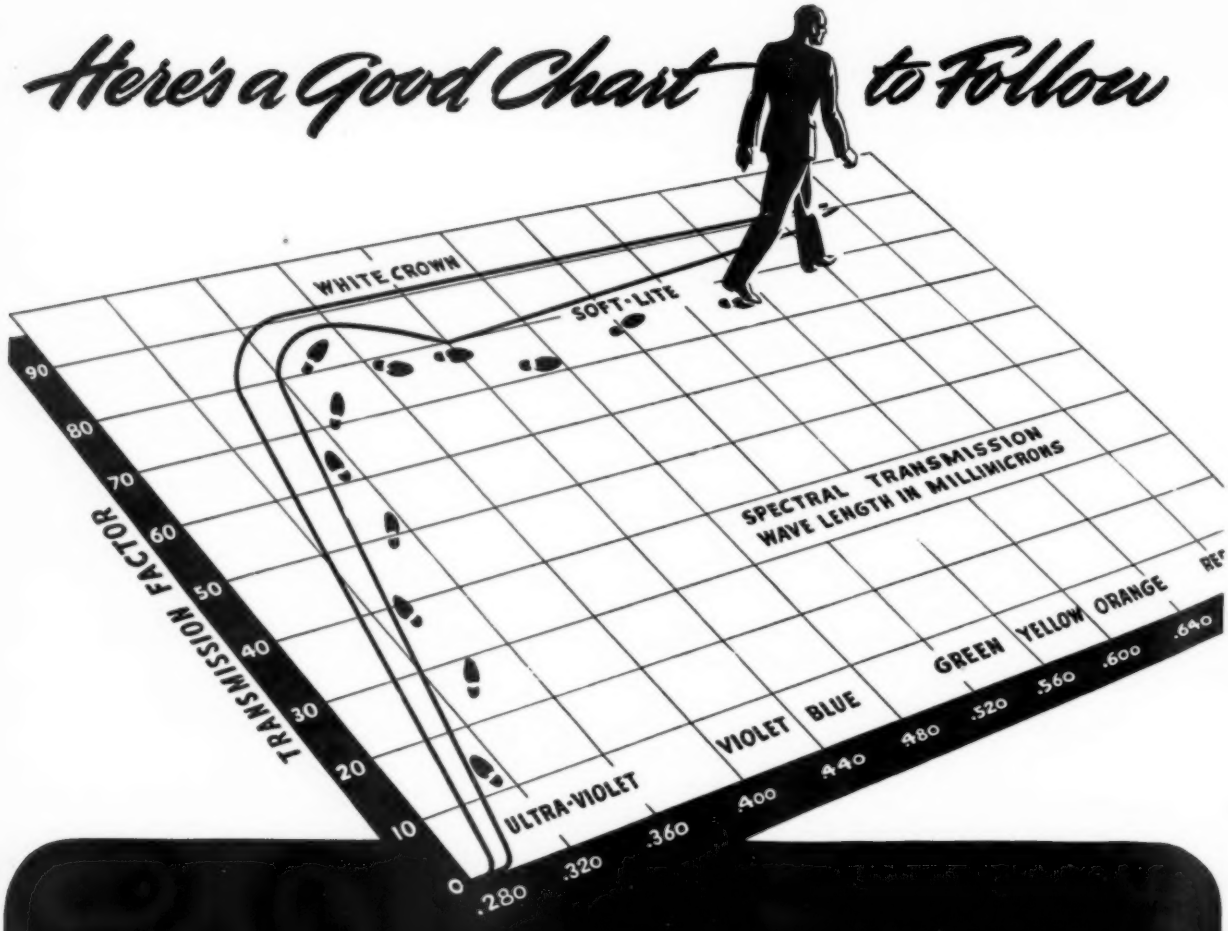

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Vol. 17 AUGUST, 1940 No. 8

CONTENTS

PAGE

ORIGINAL PAPERS

Comments on the Proper Methods of Directing the Increasing Functions of Government in a Changing Social Order. Mark M. Heald 337

Origins and Treatment of Progressive Myopia. Joseph I. Pascal 351

An Analysis of Statistical Data on Aniseikonia. Harold M. Fisher 367

ERRATUM

An Omission is Rectified and an Error Corrected in the Paper by Stoddard on Aniseikonia 350

CURRENT COMMENTS by CAREL C. KOCH

Optical Products Advertised Direct to the Public 371

The Hall Selection Test as a Diagnostic Aid in Amblyopic Cases 372

Subsidized Articles 373

Medical Series Continued 374

EDITORIALS

Headaches. G. L. DuPlessis 375

ORGANIZATION AND JURISPRUDENCE by CLARENCE W. MORRIS

A. O. A. Congress Again Defeats Optometric Public Relations Program .. 384

PROCEDURE AND INSTRUMENTATION by G. L. DUPLESSIS

A Complete Refractive Service 387

Pseudo Esophoria and Conjunctival Irritation Due to Over Use of Antiseptic Solution 391

IN THE AMERICAN JOURNAL OF OPTOMETRY **for September**

FOUR OUTSTANDING ORIGINAL PAPERS

LOW COST FIELD CHARTING, by Dr. A. N. Abbott, Shawano, Wis.

TAIT'S ANALYSIS OF THE ACCOMMODATION-CONVERGENCE RELATIONSHIP, by Drs. Glenn A. Fry and Howard F. Haines, Columbus, Ohio.

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VARIOUS CONCEPTS OF EYE WORK AND A PLEA FOR A SERIOUS INVESTIGATION OF COLOR THERAPY IN OCULAR WORK, by Dr. Norman A. Zevin, Leighton, Penna.

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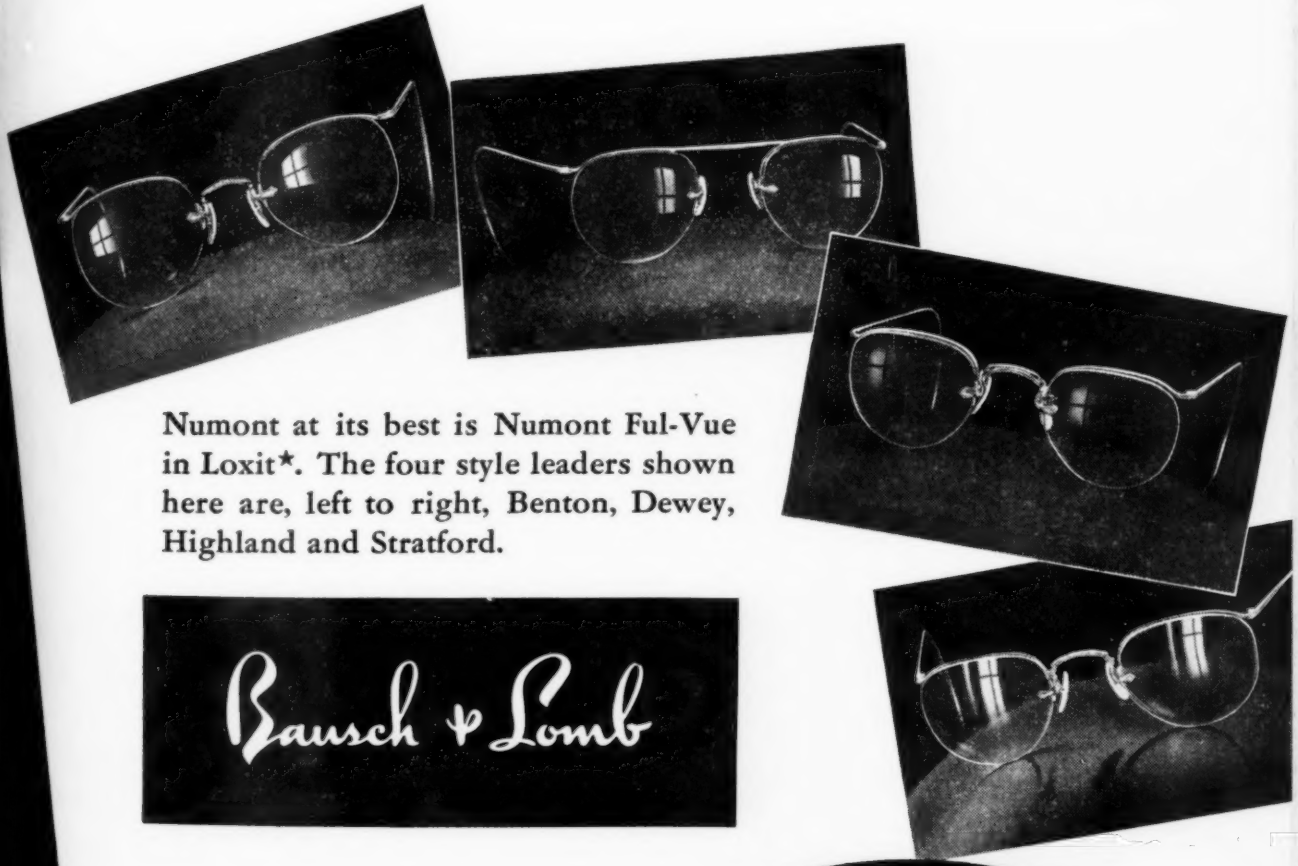

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AMERICAN JOURNAL OF OPTOMETRY

Vol. 17 AUGUST, 1940 No. 8

COMMENTS ON THE PROPER METHODS OF DIRECTING THE INCREASING FUNCTIONS OF GOVERNMENT IN A CHANGING SOCIAL ORDER*

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Rutgers University

When invited to speak before the New Jersey Optometric Association, I was asked to discuss, in a general way, the subject of where we are heading; in what direction the social forces of our time are impelling us; what are the major trends of historical change and what may we as a professional group expect in the near future? This was a big order. Anyone would be audaciously pretentious to undertake it. It is expecting the historian to be both a wizard and a prophet. It is, nevertheless, a task which must be attempted, however inadequately, by every forward looking person or organization. Your association is to be congratulated upon being aware of that fact.

The historian may, at least, bring to such a task two factors of importance: (a) an acquaintance with the broader, sweeping developments of history; forces and movements that lie beneath and introduce meaning into confusing, temporary social and political situations; and (b) the historian is likely to be more objective in his judgments, freer from both prejudice and despair. While the historian cannot be as exact in his measurements as the physicist or the optometrist, there are certain aspects of social history that can be stated in terms of demonstrable facts; and these are of far greater significance than the less historically informed persons are likely to realize. I, therefore, invite you to trace with me some of these historic trends that have a bearing upon the future of your own profession, and a still wider significance as well.

*An abridgment of the material presented before the Thirty-seventh Annual Convention of the New Jersey Optometric Association at Atlantic City, May 5, 1940. Submitted for publication May 18, 1940.

From the collapse of medieval feudalism and the first rise of modern national states, to the last initialled bureau of the New Deal or the latest flamboyant utterance of Chancellor Hitler, three historic trends of major importance are clearly evident: First, governmental organization has grown steadily larger and more complex and has absorbed responsibility for more and more types of social problems and social activity. Second, the demand for an ever higher standard of living has grown steadily more and more persistent and has extended to include larger and larger proportions of the populations of civilized communities. Third, the concept of social cooperation and coordination has steadily struggled to overcome irresponsible, socially inadequate, and destructively competitive forms of individualism and factionalism. Let us examine further these three basic trends.

First, governmental organization has grown steadily larger and more complex and has absorbed responsibility for more and more types of social problems and social activity. The irreconcilable individualist will look with horror upon this fact; so will he who interprets the word liberty to mean the right to be selfish; for both of these regard all growth of government as negative encroachment rather than as positive services. If you and I permit ourselves to be as naive as they, we too will find ourselves taking a prejudiced and negative view of this expansion of government; for most of our common prejudices regarding governmental power are due to unrealistic traditions that are hang-overs from an era when the common people existed for the state instead of the state existing for the people; relics mainly of monarchial forms of government.

To get a truer perspective, let us look at this problem from a different approach. The essential difference between barbarous and civilized society consists of orderly government, and all desirable forms of government have, as their primary purpose, the creation of a more secure and favorable environment within which the individual may operate. In other words, social organization is the essence of civilized existence and that organization is intended to make the individual's life more secure and abundant. Admittedly, both of these aims—security and opportunity—may be achieved by non-political and non-public associations of persons, such as churches, lodges, labor unions, syndicates, bankers associations, humanitarian agencies, professional organizations, etc. But to attempt security and progress through such channels alone, means inevitably that the attempt will be made in terms of limited, self-interested, factional groups on the basis of purely competitive influence or power.

Such a state of affairs, or complete anarchy, are the only alternatives to stable and extensive government in a complex social system. If there is to be coordination of these smaller factional interests on the basis of cooperation for broad objectives of general welfare, some centralizing and superior organization must undertake that task; some organization which includes all others and which acts in the interests of all. This can be undertaken only by a social organization in which all interested individuals and groups have some voice and some influence over public decisions and public procedures. Such an organization is, of course, the government, for there is no other comparable organization.

The first justification for political authority and its first duty is, therefore, regulative; i.e., to prevent smaller and more self-interested associations of mankind from working at cross purposes and thus producing a competitive, anarchistic condition of affairs. To admit this is not to argue against individualism within its proper sphere. It is obvious that individualism should not be harmfully restricted or undervalued. I do not need to spend time emphasizing to this audience the importance of preserving and encouraging individual enterprise, initiative, creative and inventive genius, and special skills; but we all do need to be reminded that such individualistic virtues cannot function effectively, if at all, in a chaotic society. It is, therefore, less obvious, but no less important, and true, that the proper increase of governmental responsibility and activity should be no more restricted than should the reasonably free play of individualism.

None of us like regulation when it applies to ourselves; but we all want regulation of others and, in our soberer moments, we realize that only so can order, stability, peace, and cooperative effort be secured in human society. None of us like the restrictions of traffic lights and stop-street signs; but all of us recognize their importance and insist vehemently that the other fellow shall observe them for the safety of all. If we were bankers, we would not like legal regulations of banking practices and stock exchange speculations; but the bank and stock exchange crisis of 1929-1933 convinced most of us that we had a right to legitimate protection from the bad judgment and dubious policies of a specially privileged group. The A. M. A. resents any proposal of governmental intervention in the affairs of the medical profession, and yet public health may assume the proportions of a major social problem which private agencies fail to deal with adequately under certain circum-

stances. Regulation for purposes of coordination is, therefore, a necessary and proper function of government.

A second proper function of government, upon which we all insist, is protection. Protection from foreign threats, internal forcible coercion, and violent disturbance of the peace; but herein lies the chief danger of governmental encroachment upon individual liberty. Throughout history, it has been the abuse of military authority, martial law, and police power that has most frequently and most seriously endangered civil and personal liberty; and yet we all insist that government shall have such powers and shall take responsibility for exercising them vigorously. The various bureaus of the New Deal are, in my judgment, quite harmless and only mildly regulative by comparison with the potential dangers of these "protective" powers of government. The use of coercive methods, ostensibly for purposes of protection, always harbors the germ of tyranny and injustice.

So far we have spoken of negative, preventive functions of government.

Let us look, for a few moments, at the positive, constructive functions. One of the most obvious social benefits of government is the ability to deal with great emergencies and disasters, such as famine, dust storms, floods, earthquakes, epidemics, and numerous less devastating public emergencies and crises. No private agencies would be willing or capable to deal with such social calamities. Even the Red Cross Association could not function as it does if it were not able to rely upon the assistance of governmental agencies and materials and the backing of governmental authority.

Another proper sphere of governmental activity is the construction and financing of large-scale, long-range enterprises requiring more extensive cooperation than any private agencies would find it possible or desirable to undertake. Such projects as irrigation, correction of soil erosion, reforestation, geodetic surveys, erecting of public highways and buildings, and innumerable other requirements of a progressing civilized community. Most projects of this nature will be of service to future generations as much or more than to the present, and must, therefore, involve long-range assessments upon the earnings of future generations. No private association of men could afford to undertake such projects or would likely be interested in attempting them. Thus, without some permanent government with the ability to levy upon future generations,

the present generation would not be able to achieve progress in such matters and benefit from them.

Closely related, is a fifth type of desirable governmental activity. This type consists of socially beneficial projects which never directly pay for themselves; non-profit developments involving great cost or present sacrifice for future advantage. Examples of these services are: military fortifications and armaments, conservation of natural resources, flood control, public parks, low-cost housing units, public education, preventive medicine for improvement of public health, etc. Private organizations are inadequate for such tasks mainly because they are non-earning or non-productive in any direct economic sense. Thus we find the A. M. A. proposing an elaborate and costly program financed by government appropriation or subsidy if any extensive plan of public health service is to be adopted.

A moment's thought should convince each of us that, in these five fields of governmental activity, each generation since 1500 has demanded more and more services and responsibilities, in order that the fortuitous conditions of life may be more and more controlled, and more satisfactory because of that control. The plain fact of the matter is that governmental activity and responsibility are necessarily and inevitably on the increase and will continue so. Higher levels of civilized existence and large and more complex societies of mankind require more and more organization, coordination, and control to ensure security and opportunity. It is necessary, therefore, that we adjust our thinking to the fact that governmental activity will not only be increasingly permitted but increasingly demanded in those matters which can be better done or done with more social responsibility and effectiveness by general collective action.

The second of the main historic trends, mentioned above, is closely related to the one I have just discussed. It is the demand for an ever higher standard of living which has steadily grown more and more persistent and has extended to include larger and larger proportions of the population. This trend has shown itself not only in better homes, better clothes, better diet, better health, and more abundant recreational and educational facilities for the average individual, but also in, what is still more remarkable, the general social gains in such matters as the development of nature's resources; a more productive economic system; increased specialization and individualization of skill, knowledge, and

creative achievement, and the developments of transportation and communication which have brought to the breakfast table, of even the so-called "lower classes," products and ideas from every corner of the earth. And equally amazing and important is the fact that such symbols of more abundant living standards as coffee, green vegetables in winter time, cigarettes, bath tubs, and college degrees, which not long ago were luxuries for the few, are now regarded as commonplace "necessities" for the many. But all of this miraculous gain in the standard of daily existence has been accomplished at the price of inescapable inter-dependence of all individuals, all groups, all nations and peoples. Such a complex pattern of living means simply that the unaided individual can no longer hope to live like his neighbors and share in the advance of the living standard through his own personal effort or attainment alone. He has become part of a complicated mechanism of modern society, in which the most striking fact is an intricate division of labor and of service. In such a mechanism, the uncoordinated individual is hopelessly lost or must fall back into the simpler and lower levels of existence which characterized life on the frontier or in peasant societies. He must share in the system that has come to exist, or he must be content with the life of the hermit.

This change to a more richly complex and interdependent existence means that, if the general mass of the people is to have access to and benefit from actual higher living standards, these opportunities must be inherent in the intricate system of life itself and not dependent upon the average individual's own unaided efforts or mere chance availability. Such a standard of living implies socialized productivity; socialized distribution of goods, services, and wealth; socialized regulation and control; in short, social organization and coordination. The modern individual, outside such a system of life, is helpless and futile. Institutionalized procedures have replaced individualized self-sufficiency; therefore "institutionalized opportunity" must replace the individualistic struggle to live. It may be that raw nature requires a stern struggle for existence, the survival of the fittest, and the ruthless elimination of the unfit; but, if civilization means anything at all, it should mean that social order reduces, to as near zero as possible, "nature's law of bloody tooth and claw" and provides organized opportunity for as good a life as possible for all human beings who have any social or spiritual value whatsoever. To the average individual, caught up and embedded in the intricate mechanism of modern society, security becomes as important a

word as liberty and, in fact, the essential basis of any real liberty worth the name. Liberty, the watchword of the free individual, must be supplemented and safeguarded by that security which is the essence of an orderly and progressive society.

The third main trend underlying our present civilization, which I have selected for emphasis, unites the two trends already discussed. It is, you will remember, that the concept of socialization has steadily struggled to overcome irresponsible, socially inadequate, and destructively competitive forms of individualism and factionalism. This involves the proper relationship of individualism and socialization. Both individualism and social coordination are essential if either the individual or organized society are to function intelligently and progressively. Only so will individualism cease to be competitive and self-centered, and government cease to be tyrannical and obstructive. Throughout the course of history, those cultures have prospered best where this balance has been most completely achieved: the Golden Age of Athens, the centers of Renaissance culture and progress, the Elizabethan era in England, and a part of our own nineteenth century achievement, to mention only conspicuous cases.

Thus, individualism and social organization are not incompatible or contradictory, as many Americans would seem to believe. They are essentially and necessarily complementary. Even the ancients recognized that fact. Aristotle frequently asserted that, the individual attains his own best self-development only within an orderly society; and it is no mere joke that Confucius says virtually the same thing, adding that that man is richest who gives most for the common good of all, and wisest who supports a benevolent government. The basic problem, then, is not the curtailment of either individualism or government, but rather the problem of directing both into proper channels of coordination.

What I have said so far has been more or less obvious. I wish now to call your attention to some facts of recent social history that are less well known, and have, therefore, had little influence upon our thinking.

The nineteenth and twentieth centuries saw the rise, within the more advanced nations, of an economic organization of production, property and wealth which came to possess as much power and influence over the daily living conditions of the people as that possessed by the political or civil organization of society: an economic state arose within the political state; each with its own group of rulers and forms of control, its own basic principles and aims but quite different in spirit and

fundamental purpose. The pre-World War economic structure of society, including to a considerable extent the professions, rested upon the principle of individualism and free enterprise; the political or civil structure rested upon the principle of socialization and collective action. The distinction between individualism and collectivism was sharply drawn between the two main fields of organized authority and control—the economic and the governmental. This encouraged conflict and friction between the two fields. Business and government began to work at cross purposes and, as new tensions developed, the two often became openly antagonistic. As government became more and more democratic or subject to popular sovereignty, economic organization became more and more autocratic and centralized in character. Tradition and bitter experience had made men wary of tyranny and arbitrary power in government, but they were strangely complacent concerning the rapid development of unchecked concentration of power in economic organization.

The average man, neither a politician nor a managing capitalist, found himself caught in the cross-fire as this conflict became more intensive in the critical post-war years. In the resulting confusion, he found himself both served and squeezed by each of these powerful organizations; he found himself in a dilemma, increasingly dependent upon but at the same time exploited by both the intricacies of large scale business organization on the one hand and increased governmental pressure on the other. However, he also found that some of his personal liberties depended upon free, individual, economic enterprise; but equally important liberties depended upon political protection and civil rights. He was at one and the same time an economic and a political citizen owing a divided allegiance to two distinct organizations of power and control within a single social system. His real personal liberties and opportunities were being largely thwarted and confused by lack of harmony and coordination between his economic and his civil life. The recurring crises of the past twenty-five years have made the average man increasingly aware that he is the victim of two conflicting systems which he can neither alter nor control. Unless this conflict can be harmonized or resolved, the average man will find himself enslaved rather than served by his own institutions of both political and economic power of ever increasing magnitude. The average man is growing fearful of the ultimate consequences of the conflict between big business and big government. To such a man one basic fact underlies all other satisfactions of life. That basic fact is security in both the political and the economic realms of

human activity and desire. By security is meant three main ideas: (a) a greater stability, certainty, and uniformity of public policy, (b) more systematized or institutionalized opportunity with less emphasis upon the individualistic struggle for decent conditions of living, and (c) the right of self-development and a reasonable independence from coercion and subservience.

This post-World War change of emphasis has involved a far more important shift in social thought and action than we as yet fully realize; a shift from idealized individualism to stabilized socialization. This important historic fact is, in itself, a subject for a whole series of talks. I have time here to mention only a few of the current evidences of this trend.

In the first place, the advocates of individualism and free private enterprise have not been content to remain individualists, but have organized into power and pressure groups such as: manufacturers' associations, veterans' associations, farmers' cooperatives, the C.I.O., the A.M.A., chain store organizations, syndicates, combines, etc., etc. The free, independent individual finds it increasingly difficult to survive unless he operates as part of an organization or association, as the complex character of life increases. Thus pressure groups form within both the economic and the civic framework of society; "wheels-within-wheels," in which the individual finds himself obligated to an increasing number of organizations. Each of these organizations purports to safeguard the welfare of its members, but each in turn circumscribes certain aspects of personal freedom. Nowhere is this fact more evident than in the position of the individual member of a modern labor union, but it is equally true of most of the other institutions with which modern man identified himself. In almost all important aspects of industrial and professional activity, the individual, as a free agent, has ceased to exist. The advantages of large scale organization have been established at the expense of free competition in small-scale individualistic enterprise and self reliance.

But, in even more subtle ways the shift of emphasis is steadily taking place; the ultimate outcome of which is certain to involve increasing emphasis upon social organization and a decrease of purely individualistic achievement. There has been, for example, a phenomenal increase in the numbers of persons who, in the search for security, are seeking salaried occupations in bureaucratic, clerical and professional positions. The octopus of large-scale organization has throttled individual

initiative and has increased the hazards of success in purely private achievement, for the person of average abilities. And I want to emphasize the fact that this has been the result of large-scale business and professional organizations even more than of the trends toward large-scale governmental organization.

The enormous increase, since 1850, of bureaucratic, clerical, and professional occupations has created a complicated problem of social economics which is one of the most fundamental causes of many of our current public problems. Most of these salaried occupations are parasitic in the economic sense that the persons involved do not actually create new real wealth, but derive their livelihood from the surplus real wealth produced by the labor of others. No adequate analysis of the ultimate consequences of this trend has as yet been made. We can, therefore, only ask the significant question: How is a just and orderly society to preserve any considerable measure of free individualism if the economically parasitic occupations continue to increase at the ratio with which they have increased in the past one hundred years?

Another significant current trend is reflected in the fact that more and more persons with moderate savings, again for reasons of security, are investing their savings in government bonds and in insurance instead of in industrial stocks and real estate; thus having the effect of subsidizing governmental and social projects and benefits rather than sharing in economically wealth-producing projects under private capitalistic management. If this trend continues, its inevitable result must mean some form of state socialism, more or less complete in character.

Even the new economic theories which discard gold as the basis for money values and substitute the idea of "managed currency" and the "commodity dollar," represent another trend toward social rather than individualistic emphasis. The individual person could actually possess gold in his own personal pocket, but only a large and well organized national government can possess all of the factors upon which money values depend under this new monetary theory. And we cannot dismiss this as a mere theoretical dream, for when the present war is ended there will be more pressure than ever before to adopt such a currency system; and our own government will be the one which will feel this pressure most as the only solution of the fiscal problems created by the fact that we now possess more than three-fifths of the world's monetary gold.

Similarly, the movements toward economic planning represent a further trend toward socialization or collective action. Crop control, bilateral trade treaties for the bartar of surpluses, wage and hour control in industry, Federal Reserve regulation of credit and interest rates, attempts to restore the balance between agriculture and industry and between capital goods investments and consumer's goods, public works programs, and all efforts toward national economic self-sufficiency and autarchy—all these and many more, represent the rapid abandonment of the laissez-faire emphasis upon economic individualism and place emphasis upon group organization and direction.

I have time for only one more of the several trends which involve the sacrifice of individualism in the interests of social welfare and security; namely, the terrific lack of balance between individualism and socialization which is involved in the demands of present-day militarism. Perhaps it is sufficient to say that no trend in contemporary civilization threatens so ominously or so completely the doom of individual freedom in its every aspect, or crystalizes more drastically the arbitrary powers of group action, or subordinates so ruthlessly the interests of the individual to the welfare of the group. But do not attempt to solace yourself with the vain hope that this Frankenstein of militarism will be eliminated from our world in this generation. Most historians are convinced that that will not be.

There is one simple but fundamental conclusion which stands out clearly from all these trends of recent history that I have discussed. It is the conclusion that only those individuals or groups, or professions will survive and prosper which succeed in adjusting themselves most willingly and harmoniously to the apparent trends away from competitive individualism and toward socialized group co-ordination under highly organized direction and control. And this, whether we like it or not! There is only one standard of successful adjustment in modern advanced community life, and that standard is determined by the degree to which the individual, the group, or the profession contributes to the general demand for service in the interest of social welfare and security. Only by attempting such a program of socialization voluntarily and with such measure of private enterprise as still survives, can we hope to avoid the desperate alternative of Fascism or the Totalitarian concept of the State.

From the viewpoint of this general background, let me close with a more specific statement of the problem as it affects such specialized pro-

fessions as yours. There is probably no need to labour the point that you must believe earnestly in the social importance of your work. You must look beyond the individual cases which you serve to the broader social values; constantly seeking new ways in which your technical skill can correct social inefficiencies in such matters as: nervous disorders, emotional unbalance, personality abnormalities, problem children, backwardness in the schools which is often explainable in terms of visual defects and consequent reading disabilities, and various psychological and psychiatric problems caused by or aggravated by defective vision and related maladjustments. To make the social significance of your profession more and more effective, you must be willing and eager to cooperate with public institutions and agencies, winning recognition and confidence through the high quality and reliability of your work and the sincerity of your social aims. You must also, individually and through your Association, strive ceaselessly to educate the public to the realization of the importance of properly corrected visual defects. And you must demonstrate, by skillful performance, the superiority of your technique in this respect.

This implies that mutual support and collaboration between the individual optometrist and an intelligently guided and progressive professional association is essential if your profession is to prosper in modern complex society. It implies also that your association must have a constructive and well integrated program of general social values which can be convincingly "sold" to the public and which will win public approval and endorsement on its own merits. It implies also that such a progressive social program should be the fruit of your own initiative and private enterprise instead of waiting for the initiative to come from governmental agencies. Otherwise, you will cease to be a free profession and will ultimately find yourselves reduced to a mere governmental bureaucracy. It is precisely the fear of this fact that makes the A.M.A. combat the current movement toward socialized medicine; but the remedy does not lie in fighting socialization of professional services or combatting governmental supervision. I predict that the attitude of the A.M.A. on this point will cause the medical profession to eventually fall upon sorry days unless they themselves have the ingenuity and the intelligence to present an acceptable program of their own, with adequate guarantees of private responsibility for socialized professional services. Professional independence and private enterprise will survive only so long as the profession keeps step with general social needs and

has the wisdom to anticipate new social benefits which that profession is able to render. Independence and private enterprise must succumb to collective public control if it obstructs or loses step in the advance of social progress. The best protection of a free profession is, therefore, its ability to offer its own program, based upon a sincere and progressive concern for social advancement and general welfare.

Above all else, I would urge that you guard with vigilance the professional standing of your occupation, by avoiding both the tricks of salesmanship and the environmental atmosphere of commercialism. High pressure salesmanship and misleading and exaggerated advertising, in the general field of business, have made the public almost as suspicious and resentful of the sales and service techniques of modern business as they are of political propaganda. The frequency of unreliable and selfish methods in business has alienated much public confidence and is the chief cause of the wide-spread popular demand for governmental supervision and regulation of business as, for example, in the case of the Food and Drug Act and the restriction of holding companies and innumerable similar evidence of this popular demand for curbing dishonest and tricky practices. Integrity is the only sound basis for any respectable business or profession: and integrity is measurable only in terms of social values, in terms of public confidence in both the motives and the quality of service of that business or profession. The carefully guarded and almost professional ethics of the *American Telephone and Telegraph Corporation* is an excellent illustration of such a business. Your profession should strive for the same kind of public confidence on a similar basis of public service and progressive technical efficiency. But you will not gain the desired result of high professional standing so long as a considerable number of you surround yourselves with a working environment that suggests commercialization. Have your own dignified offices and build up your own clientele through skilful public-spirited service rather than merely selling your wares in a corner of a department store or some little hole-in-the-wall shop in combination with a counter and a few shelves of cheap jewelry and nick-nacks. Avoid anything that smacks of commercialization as you would avoid the plague; thus you may rid yourselves of most of the obstacles of criticism which now beset your labours. Cultivate the attitude and atmosphere of a true profession with a sense of dignity and justifiable pride; thus you may escape the fate of the druggist who has almost completely lost cast as a professional apothecary and has become

merely a purveyor of toys, books, electric toasters, quick lunches and ice-cream sodas. The apothecary failed to keep step with progress in his professional field and failed to make his technical services indispensible to an advancing society. He, therefore, finds the compounding of drugs taken over by the advance of modern industrialism and subjected to an increasing degree of governmental regulation.

The surest road to professional standing and advancement is, therefore, to foster personal integrity, initiative, and technical competence in your work and to identify yourselves with those social values which your technique is peculiarly fitted to serve.

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ERRATUM

AN OMISSION IS RECTIFIED AND AN ERROR CORRECTED IN THE PAPER BY STODDARD ON ANISEIKONIA

The following figure, supplied by the Dartmouth Eye Institute, was inadvertently omitted from the article on Aniseikonia by Dr. K. B. Stoddard which appeared in the June 1940 issue of the AMERICAN JOURNAL OF OPTOMETRY, pages 253-266. Reference is made to this

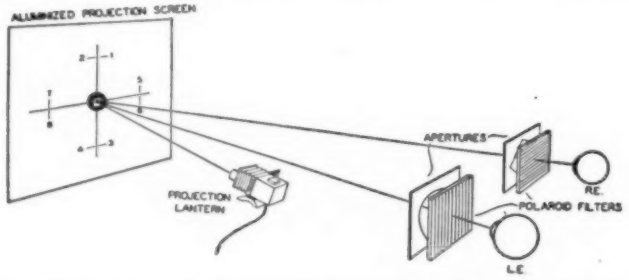

figure on page 256 where the direct comparison method of measuring Aniseikonia is being discussed. A detailed description of this technique occurs in the original article. On page 262 of the same article, on lines 4 and 5, the word "left" in each case should read "right," and on line 6, the word "lower" should read "larger."

ORIGINS AND TREATMENT OF PROGRESSIVE MYOPIA*

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The subject of myopia is a large and controversial one. Much has been written about it ever since the condition of myopia and the application of concave lenses have become a matter of concern, some one hundred years ago. A good deal of statistical research work has been done, some experimental work, but the views on the etiology, prevention and treatment of myopia are as diverse now as ever. I give you this by way of introduction in order to emphasize the fact that the subject of myopia is not a closed and completed chapter at the present time. But for that matter, there is no subject whether it be physiologic or pathologic, relating to the eye or any other organ which is a closed and completed chapter. Myopia, however, is an important subject, it is of immediate practical importance, and therefore justifies all the study one can give to it though much of the findings may be only tentative.

Of the many classifications of myopia I shall choose the simplest —dividing myopia into two types, simple myopia and malignant myopia. Both types are more or less progressive though the rapidity and extent of progression differ in the two. The essential point of difference between them is this. Simple myopia is a refractive error which can be corrected with concave lenses and which when corrected gives normal or nearly normal vision. It is not accompanied by any destructive changes in the fundus or media. It is merely a defect of focusing similar to hyperopia. It may be low, medium or high, even up to 9 or 10 diopters, but is never very high. Malignant myopia is an altogether different thing. It is a disease of the eye. Donders' statement that he regarded all myopic eyes as diseased eyes was certainly exaggerated, but it is true if limited to this type of myopia. The malignant type of

*An abridgment of the material presented before the Inter-professional Relations Committee of the New York State Optometric Association, April 28, 1940. Submitted for publication April 30, 1940.

myopia is an eye disease with a myopic error of refraction. The error may be only of medium degree, but it is usually high, occasionally very high, up to 20 or 30 diopters. This type of myopia is associated with atrophic and degenerative changes in the choroid and retina and with more or less cloudiness of the vitreous. Vision even with full correction is practically never normal and frequently is very poor. It may be helpful to itemize some of the criteria which distinguish the two types.

(1) The age at which the myopia appears. For example, myopia at birth or in infancy, except perhaps a very small amount, say, less than 1.00 D. may be considered potentially malignant.

(2) The degree of myopia. An error of 10.00 diopters or more may be considered malignant. In general, however, the age and the degree must be considered in relation to each other. For example, 6.00 D. of myopia in a young child would be malignant, the same amount in an adult of 20 would generally be simple myopia.

(3) The rate of progression of the myopia. An increase of less than 0.50 D. per year points to the simple type, an increase of over 0.50 D. per year generally points to the malignant type.

(4) The length of progression. If the increase stops at maturity, at about age 20, the myopia is simple. If it continues to progress after maturity it is malignant.

(5) And most important is whether or not there are degenerative, atrophic changes in the fundus. If there are none, it is a case of simple myopia. If there are such changes we have malignant myopia.

In spite of these criteria, however, there is no sharp line of demarkation between the two types. There are many border line cases—especially in the group running between 6.00 and 10.00 diopters of myopia.

Now the malignant type of myopia, being a disease of the eye has to be treated as such. But we have no specific remedy for this disease, no more than for other eye diseases. As you know there are very few specifics for any disease of the body. So we have to treat this condition with palliative measures. These include complete rest of the eyes at frequent intervals, use of the eyes only when absolutely necessary and then under the most favorable hygienic conditions. This embraces good indirect illumination, the use of large type print and similar measures as carried out for example in the sight-conservation classes. In addition, general building up treatment of the body as a whole, and possibly the local use of epinephrin which seems to have been of service in some

reported cases. Epinephrin seems to improve tissue metabolism and it may retard the progress of the condition by strengthening the ocular membranes. The lens correction in this type of myopia should be a full correction or a very slight under-correction. Even with the full correction, distant vision is generally poor. For near an addition of plus 3 diopters or more should be given. The accommodation in these cases is very poorly developed, and it is best not to call upon it for any work. Base-in prisms should be given in order to lessen the effort of convergence, and these may be easily obtained by decentering the lenses. In fact, most of the measures which are applicable to the treatment of simple myopia, of which we shall speak more fully, may be tried in the malignant type with the added proviso that these eyes must be looked upon as more or less diseased eyes and may need special attention.

Luckily this type of myopia is relatively rare. The simple type of myopia is the prevalent type and the one to which we must give greater concern. However, we must not give it too much concern, that is, we must not be too much upset by this type of myopia as is so frequently done. Simple myopia, especially in the lower degrees, is often an advantage. For while it does blur distant vision which is frequently of little or no consequence, it enables an individual to continue doing close work such as reading, office work, and fine artisan's work with great ease even in advanced age. The middle aged myope need not worry about reading glasses, but the hyperope and even the emmetrope of middle age and beyond are greatly handicapped without their reading glasses. From the earliest times that glasses were introduced their greatest and, at first only, usefulness has been to provide those of middle and old age with the means of seeing well at near. One of the few surviving guilds from the middle ages is the Worshipful Company of Spectacle Makers of London, which received its charter from King Charles I in 1629. On the crest of the Guild emblem is a pair of spectacles with the inscription, "A Blessing to the Aged." Now the myopes of moderate degree need no such blessing as they are never handicapped in their work at close range. The presbyopic myopes are naturally blessed. We owe a debt of gratitude to the myopes of past generations. Before the invention and general introduction of reading glasses which is a matter of only four or five hundred years the best literary and philosophic work of the times must have been done by middle aged and elderly myopes. The maturity of mind which comes with increasing age and experience is sharpened and stimulated by contact with the thoughts of others. Only the myopes

could have enjoyed such contacts through the medium of the written word long before the advent of printing. We can truthfully say that simple myopia is not such an undesirable condition though we need not go to the other extreme of denying its limitations. The impairment of distant vision robs the uncorrected myope of a great deal of the natural and artificial beauty that is all about us in the world; not to mention the handicaps it imposes upon the individual in our modern, fast moving industrialized world. But the present day myope is better off than the myope of antiquity since his myopia can be corrected.

The defect of vision known as myopia, in fact the very name, has come down to us from the pre-Christian era. It is found in the writings of Aristotle, some 400 years B.C. But as to knowing the cause of myopia, well I have already mentioned that in my introductory remarks. But before plunging into the welter of theories let us start at the beginning. At birth the eye measures about 17 mm. in length, that is, structurally it is very much shorter than the adult eye. Functionally, it is very much nearer to the adult eye. It is almost invariably hyperopic, averaging, according to the best researches, about 2 or 3 diopters of hyperopia. The emmetropic eye is rare and still more so is the myopic eye. To use numerical figures, we may say in round numbers that 95% of the new born are hyperopic, about 4% emmetropic and about 1% myopic. The adult eye at maturity, say, at age 20 or so, measures about 24 mm. The eye has grown in length from 17 to 24, that is, about 7 mm. That the eye at birth and in early infancy is only slightly hyperopic in spite of its very short length is due to the fact that the crystalline lens at that age is more convex than it is in the adult eye. It approximates a sphere with a power almost equal to that of the cornea.

Now as the child grows and the eye grows two things take place in the eye. (1) A lengthening of the eyeball which tends towards myopia, and (2) An enlargement of the crystalline lens which tends towards hyperopia. The enlargement is in the equatorial diameter which causes a flattening of the lens and therefore a decrease of power. These two phases, the elongation of the eye and the enlargement of the crystalline lens tend to offset each other in determining the total refractive power of the eye. Take, for example, an eye which is emmetropic at birth. If the elongation of the eye kept pace exactly with the enlargement of the crystalline lens all through the period of growth and maturity this eye would have been emmetropic all through the growing years and remained so at the time of maturity. The crystalline

lens, it may be added, does tend to grow and enlarge throughout life, thereby lessening slightly its refractive power. This accounts for the small amount of so-called acquired hyperopia late in life. But we are not interested in this phase at present. The point is that if the elongation and enlargement keep pace exactly with each other, then the eye will have the same refractive condition all through the period of growth and at maturity as it had at birth, be it emmetropia or ametropia. If the eye at birth was 2 diopters hyperopic it would remain so when it attains maturity.

But such perfect balance between these two elements of growth is certainly not to be expected as a general phenomenon. A preponderance of one or the other of these factors naturally leads to a change in refraction. There is no reason to surmise that the elongation of the eyeball always exceeds the enlargement of the lens so that the tendency is always towards myopia. It is perfectly possible and some statistical research confirms it that at times the enlargement of the lens may be greater than the corresponding elongation of the eyeball. As a result of this the eye would become more hyperopic than it was originally. So that if at times we find a child showing more hyperopia than he did, say, a year or two previously we need not ascribe the change necessarily to the relaxation of a so-called spasm of accommodation. It may be an actual condition of growth wherein the crystalline lens enlarged and flattened to a greater extent than the accompanying lengthening of the eyeball. Similarly the elongation of the eyeball may run ahead of the enlargement of the lens, thereby leading to myopia. An examination of children and adults of different ages shows that in a large percentage, probably up to 20 per cent, there is a disproportionate growth of eye and lens leading from hyperopia to emmetropia, and in about 15 per cent the process goes still further and leads to myopia. The myopia is generally of a slightly progressive character until growth is stabilized at about age 20. An estimate of the refractive condition of the adult population is rather hazardous, as there have been few statistical researches made. However, we may give the following figures as roughly accurate; 60 per cent hyperopia, about 25 per cent emmetropia and about 15 per cent myopia. Astigmatic errors are included under the spherical headings of hyperopia and myopia.

Comparing these figures with those found at birth, we find hyperopia has decreased from 95 to 60 per cent. Emmetropia has increased from 4 to 25 per cent and myopia has increased from less than 1 to about

15 per cent. This finding does not follow the normal distribution curve which should show approximately equal deviations towards hyperopia and myopia. Such a curve would be expected if the influences working toward either deviation from emmetropia were equally balanced. But we see in these figures that there are definitely some forces tending to produce emmetropia and to a lesser extent a certain amount of myopia. What are these forces?

Well, the malignant type seems to be mainly hereditary and there is very little we can do to eradicate this type of myopia. The problem is more eugenic then hygienic, seeking to eliminate as much as possible such strains of heredity. This by the way is not easy. Heredity does not imply necessarily inheritance from one's immediate parents or grandparents. It has been well said that our immediate parents may not be our actual parents from the standpoint of heredity. Our actual parents from this standpoint may be several generations back. When we come to the simple type of myopia heredity unquestionably plays a large part, but other factors are involved. There is some good evidence that heredity alone without involving any of the environmental factors may be responsible for many cases of simple myopia. For example, it has been found that among the Copts in Egypt low and medium myopia is very prevalent. These people represent the purest strain of the ancient Egyptian race. They are largely illiterate, but they descend from a race which maintained a high degree of culture in antiquity. The present generation has lost the culture of its progenitors, but it has inherited the myopia which goes with a high degree of culture and education. The same can be said with reference to the prevalence of low myopia amongst illiterates in Southern Italy.

But despite the illustrations just mentioned, it is more likely that heredity is not the sole cause though it probably plays the dominant role in the genesis of myopia. There is a good deal of evidence that there are environmental factors which act as secondary causes. What is inherited is really not so much the condition itself, as the tendency towards the condition. This tendency may be restrained or be given full play during the developmental stage of the eye. The presence or absence of such an inherited tendency will explain why of a group of children, all of whom were born with the same amount of hyperopia, and all of whom were exposed to the same environmental conditions only a relatively small percentage develops myopia. There is little weight to the objection against heredity being the principal factor, because in the same family some chil-

dren may be myopic and some not, even though all are exposed to the same environmental conditions. We must remember that the laws of heredity are very complex, going back many generations and even the well established hereditary traits do not affect all the offspring to the same extent.

Now what we are especially interested in is to control the environmental factors which generally act as secondary causes. What these factors are has been a matter of incessant controversy. Many theories have been advanced, some more plausible, some less plausible, in favor of this or that element. We shall briefly discuss the more important ones.

(1) A tendency on the part of a child to hold things that he looks at very near to the eyes. This may possibly be due to habit, more commonly it is due to some ocular defect such as high astigmatism or corneal opacities. Or it may be due to poor illumination. The desire to see clearly in spite of these difficulties causes a child to bring pictures, toys and printed matter very close to the eyes. This close application certainly favors the development of an inherited tendency towards myopia.

(2) The stooping position of the head in studying or examining objects. This tends to interfere with the blood circulation in the eye and according to some observers the resulting congestion and hyperemia within the eye tend to weaken the membranes, thus favoring elongation. Some claim that the stooping position causes an elongation of the eyeball purely by the force of gravity. Some experimental evidence on this view has been obtained by a study of monkeys forced to walk with their heads bent over, for a long period. Others claim that in the stooping position there is a congestion of the orbital veins behind the eyeball and this interferes with the posterior ciliary arteries, thereby impairing the nutrition of the posterior segment of the eye. Whatever the mechanism, the stooping position is certainly bad for the eye. It has been shown that active thinking is improved when one leans back and puts his feet up high. Possibly the habit of many men to put their feet up on the desk and lean back when engaged in thought has a physiological basis. The position is actually conducive to better thinking because it improves the blood circulation in the head. With the head in the upright position the circulation of the eye is also better.

(3) Studying and reading under poor illumination which indirectly of course necessitates bringing the book close to the eye. And as was mentioned before close application unquestionably favors a tendency towards myopia.

(4) The act of convergence, an act which becomes almost automatic as soon as single binocular vision is established. This factor needs some elaboration.

A number of competent observers consider that convergence which is always used when applying the eyes to close work whether play or study is the chief if not the only cause for the development of myopia. It seems more reasonable not to go that far, but one can safely say that convergence, both the innervation and the act, is an effective contributory cause to the development of myopia. It helps to make manifest an inherited tendency. Just how convergence acts to cause myopia is not altogether agreed upon. Some believe that during the act of convergence there is a forward pull of the recti-muscles which has to be balanced by the backward pull of the oblique muscles. As the oblique muscles are attached to the posterior half of the eye-ball, their pull on the sclera, in cases predisposed to stretching by a weak scleral tissue, will cause an elongation at the posterior pole. It is not difficult to visualize this process. As the internal recti contract to turn the eyes nasally they must also tend to pull the eyes into the orbits since their origin is at the apex of the orbit. The external recti don't just yield passively to the pulling of the interni. If they did there would be a sudden and jerky movement of convergence. They relax gradually and in a controlled manner so that they still maintain tension, pulling the eyeball backwards into the orbit toward their point of origin. The oblique muscles originate functionally at the base of the orbit and by their tension prevent the eyeball from receding into the orbit during the act of convergence. The antagonistic pulling of the two sets of muscles is thought to cause the stretching at the posterior pole. Possibly also the tension of the antagonistic muscles causes a compression of the eyeball with a resulting increase in the intra-ocular pressure. A congenitally weakened sclera would yield to the increased pressure by stretching.

Some believe that during the act of convergence there is an interference with the venous outflow of the blood from the eye; this leads to hyperemia and congestion, interferes with nutrition and causes a softening and stretching of the sclera at the posterior pole. These explanations apply to the development of axial myopia, partly as a result of excessive convergence.

Still another view of the role of convergence in myopia concerns what may be called refractive myopia, i.e., myopia caused by an increase

in the power of the crystalline lens. This theory depends on the well known interrelation between the accommodation and convergence. An excessive convergence innervation which may be required for one reason or another will tend to produce an excessive accommodative innervation resulting in a higher tonicity of the positive accommodation and leading to refractive myopia. I shall speak of this again in another connection.

But whatever the mechanism, it seems fairly certain that the act and innervation of convergence, especially when excessive is an important contributing cause to the development of myopia.

(5) Some observers have blamed metabolic and endocrine disturbances for the genesis and progress of myopia. The term, "scleral rickets" has been coined to denote a weakening and a softening of the sclera comparable to the weakening and softening of the bones in rickets. The fact that myopia frequently develops most rapidly at puberty and during adolescence supports this theory. It is during adolescence that the glands of internal secretion are especially active and unstable. Any dysfunction of the glands would be most apt to show its deleterious effects at that period. It is also during this period when growth is most rapid. The lengthening of the limbs and the enlargement of the skeleton in general are very apt to produce a deficiency of calcium in the metabolism of the sclera. The use of endocrine products, vitamins, especially vitamins A and D, and calcium combined with parathyroid extract have therefore been advocated for rapidly progressive myopia.

(6) The role of the ciliary muscle in the etiology and control of myopia. This point, however, needs some preliminary exposition. The current teaching with reference to the ciliary muscle is that it can act in only one way, that is, its contraction always leads to an increase in the power of the crystalline lens. But this view is not entirely satisfactory. We know that anatomically the muscle consists of at least two definite sets of muscle fibers differently arranged. There is also clinical and pharmacological evidence to suggest that the ciliary muscle really comprises two sets of opposing muscle fibers. Muller's circular muscle and Bowman's longitudinal muscle. The innervation to these two muscles seems to come from different sources; the para-sympathetic, third cranial, for Muller's muscle, and the sympathetic for Bowman's muscle. The refractive power of the crystalline lens depends primarily on the tension of the suspensory ligament or the zonule. The tension of the zonule in turn depends on the tonus and activity of the two muscles in the ciliary body. Increased tension on the zonule leads to a flattening of the lens, this

seems to be brought about by a contraction of Bowman's muscle and may be termed negative accommodation. Lessened tension on the zonule leads to a bulging of the lens and this is brought about by the contraction of Muller's muscle, and may be termed positive accommodation. The convexity of the crystalline lens in the static condition, depends upon the relative tonus of these two muscles. Myopia resulting from a heightened tonus of Muller's muscle may be called refractive myopia and is a simple refractive error. It leads to mild degrees of myopia and is not associated with any deleterious changes in the fundus.

It is possible that in some reported cases, where the local use of epinephrin has caused a diminution in the amount of myopia, the diminution was brought about by a strong stimulation of Bowman's muscle, causing some flattening of the lens. Epinephrin, as you know, is a powerful stimulant of the sympathetic system. There have been some attempts to correlate myopia with the body build. Perhaps there may be some correlation between myopia and the two divisions of the autonomic nervous system.

The type of refractive myopia just referred to is especially apt to develop where there is a primary exophoria. The power to converge the two visual axes to the point of attention is a faculty but recently acquired in the course of evolution. It is fully developed only in the primates. As a recently acquired faculty, the convergence center is very apt to show different degrees of development in different children. In addition the configuration of the face sometimes makes the convergence act specially difficult, e.g., when the eyes are relatively far apart. Here the convergence center would have to be especially strong in order to produce the necessary convergence. Now where those two factors are associated such as a weak convergence center and a large interpupillary distance, the convergence act requires additional strong stimuli. Strong fusional or supplementary convergence innervation is required in order to produce binocular fixation.

This excessive convergence innervation is bound to produce an associated excessive innervation to the positive accommodation. The tonus of Muller's muscle will be relatively heightened with a consequent increase in the power of the crystalline lens and resultant myopia. The beneficial effects of base-in prisms in the treatment of myopia is partly due to their lessening the convergence innervation. Just how much of this refractive myopia can be caused by primary exophoria depends upon several factors. For one thing upon the strength of the bond which links

the two functions of convergence and accommodation. Naturally, where these two functions are but loosely associated there is that much less tendency for the exophoria to cause myopia. By means of dissociating exercises it is possible to loosen the bond between these two functions and such exercises are especially desirable in these cases of myopia.

(7) This involves the interrelation of myopia and civilization. The bearing of civilization on myopia may be examined from several viewpoints. On the theory that myopia is largely hereditary civilization preserves myopia by making it possible for the myopes to survive. In a primitive society of hunters and fishermen those whose sight deviated markedly from normal were doomed to extinction. Especially those with an appreciable degree of myopia which naturally impaired their distant vision were apt to be weeded out. Thus their myopia could not be passed on to succeeding generations. The handicap of myopia to hunters and soldiers even in a civilized society, especially before the introduction of concave lenses, needs no elaboration. We may note that this handicap may affect equally the humble and the exalted. According to historical account, King Gustavus Adolphus of Sweden was killed in 1632 at the battle of Lutzen because of near-sightedness. Although the Swedes were victorious in the battle, the king because of his very poor vision mistakenly rode into the enemy's lines and was killed. Such a process of extinction of the visually unfit must have been very much more prevalent in primitive society.

The advent of civilization with the introduction of various aspects of culture provided a safe niche for the myopes. They become the fine artisans, the scribes and the learned men of the community. They were preserved and their myopia was given the opportunity of affecting succeeding generations. An interesting confirmation of this is found in the case of the Copts in Egypt and the illiterate myopes of Southern Italy, as was mentioned previously.

There is another aspect to the role of civilization on the genesis of myopia which deserves consideration. Many competent observers without denying that heredity probably plays a part in the etiology of myopia have laid great stress on the intensive use of the eyes for close work as the chief cause of myopia. They emphasize that modern civilization makes tremendous demands upon the eyes for close range vision. Our educational system is geared for near vision, and our industrial system likewise demands acute near vision. Thus it is said that myopia is the

curse of civilization—it is a penalty we have to pay for emerging from a primitive society to a civilized society. One will hardly question that our present society is a civilized society from the standpoint of technology and education. From a moral standpoint, seeing what goes on in the world today, we are possibly behind many of the most primitive societies.

Other observers still regarding excessive near work as the chief cause of myopia have taken a more cheerful view, namely, that myopia is an adaptation to civilization. They say it is nature's way of adapting the individual to his new civilized environment. I believe there are good grounds for the contention that in some cases, at least, myopia is an adaptation to new conditions. We find such organ adaptations all about us. Take the long fingers of the violinist, as an example. The constant stretching of the fingers in the course of exercising produces a favorable growth, possibly some stretching in order to attain a better adaptation of the fingers for the task at hand. The myopic eye is certainly better adapted for near vision from the standpoint of comfort than even the emmetropic eye and it seems perfectly logical to postulate such an adaptation to use. We cannot say that much for all eyes developing myopia, and it is not easy to overcome the objection as to why some eyes should adapt and others not. We know, however, that the capacity and rate of adaptation of an organ or an organism to a new environmental need differs enormously even amongst members of the same group. So that we may expect that only in a small proportion of cases will this adaptation of an organ to function best under new conditions show itself.

One cannot tell off hand which cases of myopia are manifestations of an adaptive process and which are not. But we have a good clue. Cases of myopia, true myopia associated with esophoria and with low abduction seem to be of this type. The esophoric case, too, may be part of the adaptive process, because an esophoric myope is of all eyes best adapted for close work. That esophoria and myopia do not often go together shows that this adaptive process is not too prevalent. But the importance of recognizing it is in the manner of correcting it. If we let the minus lenses which correct the myopia for distance be worn at close range we are engaging in an artificial and unequal battle with nature. By the use of minus lenses at near we are thwarting an adaptive process and causing the development of an ever increasing amount of myopia. It is in such cases especially where we must incorporate a plus addition in the lenses so as to leave the eye myopic for its near work.

Finally, point 8. There are some cases of myopia which seem to develop on the basis, in part at least of a thyroid disturbance. This is to be noted especially in children who are overweight. In these cases, in addition to whatever other measures are adopted it is well to have an accurate basal metabolism test made. If the metabolic rate is minus, the use of thyroid extract is indicated until the rate goes to the plus side, say, to plus 5 or plus 10.

We have examined briefly some eight contributing causes to the genesis of myopia. I have not discussed the pros and cons of all of them because of lack of time. Suffice it to say that there is some evidence in support of practically every theory mentioned. The upshot of which is that myopia is most likely due to a number of factors. The practical significance of this is that the treatment of myopia embraces the application of more than one procedure. Now our chief interest is to control the development of myopia so that it progresses as slowly as possible, and stops at as low a degree as possible. We cannot entirely prevent it, if there is an inherited tendency to the condition, but we can control it to some extent. I have already alluded to one or two measures which may be taken with that end in view. But before elaborating on those and a few others it will be well worth while to say a few words on the use of drugs in myopia.

There have been various attempts made to control the progress of myopia by means of drugs. The drugs that have been advocated have been: first, atropine, on the basis of paralyzing the accommodation in the myopic eye so as to put the eye at rest. The rationale of the procedure was that the accommodation even in myopia when active tends to increase the myopia. There is some support for this view, but we can set the accommodation at rest without atropine. The practice has been largely abandoned.

Another drug introduced was pilocarpin. This drug is still occasionally given in cases of myopia in children. The purpose behind this procedure is to lessen the intra-ocular pressure similar to the procedure in glaucoma. The rationale of this step is that the lengthening of the eye and the development of myopia is partly due to the inability of the sclera to withstand the normal intra-ocular pressure. By lessening the intra-ocular pressure with pilocarpin, the sclera even if it is congenitally weaker than normal, will be able to withstand the lessened pressure without stretching. There is some merit to this reasoning, but the results have not been such as to encourage the general use of this drug.

The third drug used is epinephrine or adrenaline. There have been some reports on the use of this drug in checking the progress of myopia. The rationale advanced for its use is the fact that it improves the metabolism of the body and raises the tonus of all the ocular membranes. Possibly the diminution in myopia, reported was due to a stimulation of the negative accommodation in the eye. It is very likely as was pointed out before that the ciliary muscle has a double innervation, a parasympathetic innervation which causes increased power of the crystalline lens and a sympathetic innervation which causes decreased power of the crystalline lens. Now epinephrine is a powerful stimulant of the sympathetic system and Bowman's muscle is especially well developed in myopia. It can thus be seen that by stimulating this muscle a lessening of the refractive power of the crystalline lens would take place, and a diminution in the amount of myopia would result. On the whole, however, control of the factors conducive to myopia by means of drugs has but little promise.

To summarize our findings. About 15 per cent of the children who are born hyperopic develop myopia. There is less than 1 per cent of myopia found at birth and about 15 per cent in the adult population. A very small proportion of myopia (less than 1 per cent) is of the malignant type, which tends to progress more or less throughout life. The bulk of myopia is of the simple type. But all myopia tends to progress at some time during the period of growth to maturity. The cause of the malignant type is definitely hereditary, environmental factors are of little account except those which have a debilitating effect on the body as a whole.

The causes of simple myopia are probably numerous. For one thing simple myopia may develop as an adaptation to modern needs and a small percentage of growing eyes probably does so develop. This type of myopia is most likely to be associated with a relative orthophoria or esophoria at near, but it may not. It is in cases of this type especially where a plus reading addition is called for.

For another thing some cases of simple myopia may develop as a refractive myopia on the basis of a primary exophoria. This type of myopia is most likely to be associated with a fairly high degree of distance and near exophoria. And it is in these cases especially that dissociation exercises are called for, also, the application of base in prisms.

Aside from these two small groups of myopia which do not rest on an hereditary basis the bulk of myopia develops on the basis of an

hereditary predisposition supplemented by a number of environmental factors. We cannot control the hereditary background very well, but we can control more or less the contributing elements. How and what to do we may list under several headings.

(1) *Hygienic measures.* These include:

(a) Correct posture, that is doing all near work as much as possible with the head erect. The child, or the myopic adult for that matter, should be cautioned against doing any work in a stooping position.

(b) Adequate working distance. That is, the parents and teachers should insist that the child keep all near work of whatever nature as far from the eyes as possible. Any astigmatism which interferes with clear seeing should be corrected very early. Where there are corneal opacities which interfere with good vision only objects and toys of large size should be used in infancy and books with large print later in school as is done in the sight conservation classes.

(c) Good illumination. That is, the illumination should be ample and well placed. However, it should not be too bright especially in the higher degree of myopia, as these eyes are unduly light sensitive. Incidentally, the habit of many children to spread out the so-called funnies on the floor and pore over them is extremely bad. The stooping position assumed, the poor illumination, the frequently poor and sloppy printing used in the funnies, all these are very harmful to the eyes.

(d) Wholesome outdoor exercises, but only moderate exercises. Strenuous exercises for myopic children or adults are worse than none, I believe. Avoid especially stooping and lifting exercises.

(2) *Dietetic.* The diet should be adequate and well balanced with reference to vitamins and minerals, in particular, vitamins A and D. Where there is evidence of rapid bodily growth and possible calcium depletion the diet should be supplemented with calcium and parathyroid extract. In obese children with a low basal metabolism thyroid extract may be given with beneficial results.

The measures so far outlined are of a general prophylactic and supportive nature. We will now add four specific optical steps: (1) Careful measurement of the myopia—finding the full amount, but not necessarily giving full correction. It is best to slightly undercorrect, say, to within 0.50 Diopter. This will give about 20/30 vision which is generally ample. However, if the undercorrection irritates the patient, as sometimes happens if the patient had worn previously a full or an overcorrection, then it is best to give full correction. These patients respond poorly to even a slight undercorrection. (2) Visual dissociation exercises

in selected cases. The object of these exercises is to loosen the bond between the convergence and the accommodation and thus prevent an excessive convergence innervation from inducing a higher tonicity of the positive accommodation leading to refractive myopia. These exercises are especially useful in cases of myopia developing on the basis of a primary exophoria, but they may be used in other cases as well. (3) The use of a plus addition at near of, say, plus 2.00 diopters. This procedure is especially indicated in the type of myopia which seems to develop on the basis of adaptation to use. But this procedure need not be limited to only such cases. (4) The use of base-in prisms. Again this is a procedure especially indicated in myopia associated with a primary exophoria. But it is a procedure which should be widely used, in fact in cases of all types. The effect of the prism is to lessen the amount of convergence needed, to repress the convergence innervation and to enlarge the working distance. Even in cases of low abduction, one can start with a one delta prism base-in over each eye and increase it as the case progresses. Usually it is possible to start with a 2 delta prism over each eye. But this is a matter for individual judgment.

There is just one other point which may be mentioned with reference to the treatment of myopia and that is the frequent improvement in the vision of myopes, especially myopes of medium and high degrees, by the use of contact lenses. The improvement is particularly marked when the myopia is complicated by astigmatism which it usually is. From the manifold advantages of contact lenses in general, a subject which does not concern us just now, I wish to call attention to this phase alone, that of improvement in the visual acuity of myopes. I have had a case recently where the best vision in the left eye with spectacle lens of —7.00 D.Sph. ⌒ —2.25 D.Cyl. Axis 180 was less than 20/60. With a contact lens correction the vision improved to 20/30, an improvement in acuity of over 100%. Some practitioners have claimed that in their experience the use of contact lenses helped to check the progress of the myopia. This work, however, has not been confirmed. But the improvement in vision over the best spectacle correction is a frequent occurrence.

This has been a lengthy paper but it by no means exhausts the subject of myopia. I believe, however, I have presented a fair cross section of the subject as it stands today with some suggestions which may be of value in your daily practice.

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AN ANALYSIS OF STATISTICAL DATA ON ANISEIKONIA*

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In presenting this data it must be understood that it is not entirely complete and that any analysis attempted at this time is only to demonstrate something of the limitations, applications and probable usefulness of iseikonic corrections.

Eight hundred and thirty-six patients were examined. However, the tests upon 64 of this number were not completed due to failure on the part of the patient to fully cooperate, the presence of unbalanced visual acuity, lack of fusion or age of the patient.

In 163 cases no aniseikonia could be demonstrated, that is, no aniseikonia of less than one half of one per cent. In 85 cases, no prescription was given because of financial reasons. In 68 cases, prescriptions were given but were not filled for reasons entirely unknown. Thirty-six cases were given prescriptions which were filled but made no progress report.

About half the entire group or 420 patients were given prescriptions and reported their results

Of that 420 cases, 114 reported unfavorable results—that is, their previous symptoms had not been helped. In 306 cases or 72.8 per cent definite favorable results were reported—that is to say, their previous symptoms had subsided and the patients reported the need of wearing their aniseikonic corrections. Of this group of 306, 21 border-line cases reported slight improvement. There were probably some of the 114, who did not get any less results, but felt that the little results they did get was not worth while. The 107 cases we termed "moderately improved" were patients who felt that they had a very definite improve-

*An abridgment of the material presented before the American Academy of Optometry.

ment although they still had some slight difficulty. The 178 patients who reported marked improvement were those who obtained complete relief from their complaints. This group amounted to 42 per cent.

It is also of interest to compare the entire group with some of the special groups. You will note in Table 1 that of the entire 836 patients, 59 required no refractive corrections, that is to say no correction was made in those patients showing one quarter of a diopter or less. Of that group there was only one case which was not completed. As a group they were fairly normal in every respect, yet in only 17 of them was no aniseikonia found.

Further in the same table, of the patients who were given corrections and reported back, 88 per cent gave favorable results.

It is of interest to note that here we may have an aniseikonia without any refractive error existing or even a refractive difference being present. A recent publication of the Dartmouth group definitely indicates that there is no useful mathematical relationship between aniseikonia and anisometropia. Their findings give a coefficient of correlation of six-tenths between refractive differences and size differences in a group of 400 patients who reported favorable results. The very fact of having a difference between the two eyes is a matter of refraction. A loose interpretation of the correlation would be that the square of the coefficient indicates about the number of factors which are common to the two groups being correlated. The square is thirty-six one hundredths or about one-third. That is to say, there are about one-third of the factors common to anisometropia that are also common to aniseikonia. This is in agreement with the statement that there are two main factors in aniseikonia—one the optical factor and the other the anatomical factor, as related to the mosaic pattern of the rods and cones. Breaking this down in terms of the coefficient of correlation we have the optical factors with respect to the lenses, and also optical factors in the eye itself.

In the last four columns of Table 1 is shown the incidence of anisometropia, each group being broken down to its relative ammetropic differences.

Of the first group (over .50 D.) only ten per cent had no aniseikonia or 90 per cent of the patients who have an anisometropia of over one-half of a diopter also have aniseikonia. However, it is impossible to deduce from the amount of anisometropia indicated, precisely what the size correction should be. There is no mathematical relationship.

TABLE 1

RESULTS IN 836 PATIENTS EXAMINED FOR ANISEIKONIA BY MEANS OF THE OPHTHALMO-EIKONOMETER

	Entire Group		Cases Requiring No Refractive Correction		Cases Having Anisometropia							
					All Over 0.50 D.		0.50-1.00 D.		1.12-2.50 D.		2.62 D and up	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Total	836		59	7.1	109	15.4	55	6.6	28	5.7	26	3.1
Test Incomplete	64	7.7	1		7		2		1		4	
Test Showed less than 0.50% Aniseikonia	163	19.5	17	29.3	11	10.1	6	11.3	5	10.6	0	0.0
Test Showed over 0.50% Aniseikonia, but Iseikonic Rx not given	85	10.2	3		7		2		4		1	
Iseikonic Rx Given, but not worn by Patient	68	8.1	10		10		5		3		2	
Iseikonic Rx Worn by Patient but Result not reported	36	4.3	3		7		2		5		0	
Iseikonic Rx Worn by Patient, and Result Reported	420	50.2	25		87		38		30		19	
Patients Reporting Unfavorable Result	114	27.2	3	12.0	20	23.0	7	19.5	9	30.0	4	21.1
Patients Reporting Favorable Result	306	72.8	22	88.0	67	77.0	31	81.5	21	70.0	15	78.9
Patients Reporting *Slight* Relief of Symptoms	21	5.0	1		5		2		3		0	
Patients Reporting *Moderate* Relief of Symptoms	107	25.5	7		22		10		7		5	
Patients Reporting *Marked* Relief of Symptoms	178	42.3	14		40		19		11		10	

However, there appears to be a relationship between the incidence of anisometropia and aniseikonia. In the last three columns of Table 1, it will be noted that of those patients having less than one diopter of anisometropia, 11.3 per cent had no aniseikonia; of those with an anisometropia of between 1.12-2.50 diopters, 10.6 per cent had no aniseikonia but of those manifesting an anisometropia greater than 2.62 diopters, all had aniseikonia.

This then would be in agreement with common clinical experiences relative to the necessity of "getting used to glasses," for here we find the patient making an adjustment. When the change or difference is too great, however, (outside the limits of tolerance) the constant conscious effort by the subject to compensate leads to fatigue and discomfort.

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Current Comments by Carel C. Koch

Editor, American Journal of Optometry

Optometrists will confer a favor by sending for this department items of news of general interest; such as relate to new instruments, clinical techniques, education, public health and optometric legislation.

OPTICAL PRODUCTS ADVERTISED DIRECT TO THE PUBLIC

At the recent meeting of the American Optometric Association in Cincinnati, the delegates adopted a number of resolutions, among them the following:

> WHEREAS, certain manufacturers of optical products have adopted a policy of advertising these supplies to the profession and the public by trade name, and
>
> WHEREAS, the furnishing of these products by an optometrist to his patient is an integral part of the practice of the profession of Optometry and is strictly within the professional judgment of the examining optometrist, now therefore be it
>
> *Resolved,* that the American Optometric Association disapproves the policy of certain manufacturers which recommends that optometrists prescribe by name; be it
>
> *Resolved,* that the distribution of certificates or any other advertising media describing optical products by trade name is likewise disapproved; be it further
>
> *Resolved,* that it is the recommendation of this association that the JOURNAL OF THE A.O.A., or any official bulletin or publication of an affiliated state, local or district association refrain from accepting any advertisement which is disapproved by this resolution, and be it further
>
> *Resolved,* that a copy of this resolution be sent to all manufacturers known to engage in either or both of the disapproved practices.

The same delegates, who by this action established a policy for the A. O. A. relative to manufacturers advertising optical products direct to the public, refused also to approve a proposal that the A. O. A. engage in a program of public relations, to thus improve the economic status of all optometrists. It is difficult to reconcile these two actions.

Had the delegates themselves been willing to embark in a fund raising campaign, with which to do an effective piece of work in developing interest in eye care and in optometric matters in general, one might possibly understand their wish to limit such promotional activities to the A. O. A. and thus ask various manufacturers to step aside while this was being done, although this too would have, in the writer's judgment,

been an unnecessary request. On the other hand, however, in view of the fact that these delegates decided that optometry needed no immediate effective publicity or public relations program of its own, it then seems most unwise to the writer, to at the same time, attempt to discourage those few optical concerns who are now carrying on national advertising campaigns, in part at least, of eye conservation nature.

A careful review of the copy now being carried in the only large campaign[1] under way at present, reveals the fact that three-quarters of each ad is devoted exclusively to selling the need for proper, periodic eye care. Furthermore, these people make no attempt to sell their lenses direct to the public and whenever they do talk about their products, everything is done to indicate that these must be *prescribed* and that only an eye examination can determine whether or not these are needed.

From the standpoint of the practicing optometrist, the writer feels that this type of lay-advertising is both an effective and splendid stimulus, and instead of censuring our optical manufacturers for this activity we should commend them. Theirs is the only organized direct effort now being made to make the public eye conscious, and as the recipients of much that is good from this activity we could do many more effective things, than draft and pass resolutions of the type just quoted.

THE HALL SELECTION TEST AS A DIAGNOSTIC AID IN AMBLYOPIC CASES

After a diagnosis of amblyopia has been made, the optometrist is then confronted with the problem of whether or not the case is amenable to treatment. This is always a more or less moot question in these cases, yet some quite reliable data can be obtained by using the Hall Selection Test which serves a useful purpose as a differential diagnostic test in cases having an acuity of 20/60 or better in the amblyopic eye.

The problem of the value of treating an amblyopic eye rests upon the following point: A congenital amblyopia will not as a rule respond to treatment, while an amblyopia ex anopsia will frequently respond. The test to determine whether or not the eye is congenital or ex anopsic, was devised, as far as the writer is aware, by the optometrist Hall of Cleveland. Hall reasoned that in a case of amblyopia ex anopsia the

1. Campaign being conducted by the Soft-Lite Lens Company. Squibb Building. 745 Fifth Avenue, New York City.

sensitivity of the macula has, due to suppression, deteriorated below the level of sensitivity of the peri-macular area, while in congenital amblyopia, there is a total absence of macula and therefore the macular area and the peri-macular area have about the same visual sensitivity.

Using this theory as a background, the optometrist Hall devised the following selection test, which, as the writer has said before, works well in cases having at least 20/60 or better vision in the amblyopic eye. Two similar bright red stickers of about ¼ inch in diameter are mounted on a pair of black wires or very thin rods. The stickers are held about 1½ inches apart and about 20 inches from the amblyopic eye, the normal eye being first occluded. The patient is asked to look at one of the stickers and tell whether or not this sticker is brighter than the other. If the patient answers that the non-fixed sticker seems brighter, the diagnosis is, that the eye under observation is suffering from amblyopia ex anopsia. If the answer is that the two stickers seem the same, the diagnosis is that the eye under observation is suffering from congenital amblyopia.

SUBSIDIZED ARTICLES

From time to time we receive letters from readers who, "know for a fact, that some certain article (which was used in this journal) was paid for by one or the other of the large optical manufacturers." In the past, in reply to these letters, we have merely written back that such was not the case and have taken no further notice of the matter. Last month, however, we received a nice letter from one of the optometric leaders of the far west, who again raised this question and it seems therefore that this is an appropriate occasion for the editorial board of this technical publication to make its position relative to this matter clear for all time. Our subscriber writes as follows:

> "The AMERICAN JOURNAL OF OPTOMETRY has come to my office regularly for the past 14 years and I have enjoyed and been benefitted by it to no little degree. In the last year or so, however, I have heard several optometrists observe that some of the original material which you have run, has been paid for by the concerns who have made the material or instruments discussed in the articles mentioned. Would it not be a good policy for you to enlighten your readers as to the manner in which your original material is selected and allay thereby such possible feeling that perhaps this or that article was paid for by the concern either mentioned directly or whose products were mentioned? As I have already said, I enjoy the AMERICAN JOURNAL OF OPTOMETRY and because of the fine position occupied by this technical journal in optometry, I believe it both fair to you and to us all to have this matter cleared up, once and for all."

While it is almost embarrassing to us to have to say this publicly, the request is, we suppose, a natural one and our answer to it follows: On behalf of this magazine, we emphatically state that no consideration of money or anything else, other than our own editorial judgment, has ever, in the past, or will in the future, influence the publishing of technical material in the AMERICAN JOURNAL OF OPTOMETRY. This factual statement places us on record regarding the matter. Then, too, it must be clear to anyone giving much study to this, that even if there were no such thing as ethics in the publishing business, a specialized journal in the health field that tried to get across technical subsidized material to its readers would be engaging in such an obviously fraudulent activity that the magazine that attempted it would be out of business in a relatively short time. The articles which are published in the AMERICAN JOURNAL OF OPTOMETRY are selected upon their individual merit and because each of these original papers, in both that section of the journal as well as those in its many various departments, seem to present some useful announcement, interesting comment or bit of original thinking which we have felt would be of value to the optometrists of America. This policy will continue.

MEDICAL SERIES CONTINUED

First and foremost a magazine of ocular refraction, the AMERICAN JOURNAL OF OPTOMETRY nevertheless explores many fields besides its chief one, and, as no subscriber needs to be reminded, has published occasional notable medical articles which were especially written for optometrists. *Sinus Disease and Orbital Infections* by Martyn Kafka, M.D., in the May issue of 1938. *Vitamins in Eye Work* by John C. Neill, Opt.D., in the December issue of the same year, and *Plastic Corrections for Eyelid Deformities* by Mortimer M. Koop, M.D., in the January issue of 1940 have all received widespread professional attention.

The editorial board is happy to announce a continuance of this splendid series. In our November, 1940, issue, we will present a paper dealing with aural involvements. A paper entitled *Ocular Disorders and Ear Conditions* by Martin A. Furman, M.D., which may prove to be in many ways the most remarkable of the series. It is not strictly an aural paper but rather an article dealing with the diagnosis of certain ear problems, written to acquaint the practicing optometrist with some of the technical work being done in this important field.

AMERICAN JOURNAL OF OPTOMETRY

Established 1924

Vol. 17 AUGUST, 1940 No. 8

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Annual Subscription, $4.00 in Advance; Canada, $4.50; Foreign, $5.00.
Single Copies, 50c.

Original papers, scientific communications, clinical reports, books for review and correspondence should be sent to the editor. Subscriptions and applications for single copies should be addressed to the circulation manager. Copy of advertisements must be sent in by the first of the month preceding their appearance. Communications with reference to advertising or other business should be addressed to the advertising manager.

Published Monthly by the
American Journal of Optometry Publishing Association.

The Journal has no objection to the reprinting by other magazines of any of its articles, provided such reprints are properly credited to the AMERICAN JOURNAL OF OPTOMETRY.

HEADACHES

Most ocular complaints are associated. Patients seeking relief in glasses usually describe a variety of symptoms most of which have nothing to do with the ametropia, or if connected, are grossly exaggerated. A headache is merely a symptom. It may relate to an abnormality remote from the seat of the pain or it may be due to an abnormality right at the location of the ache. It is impossible to identify the cause by the location of the headache. However, certain locations are not usually associated with eye conditions. A clear understanding of the ocular condition and careful questioning is often enough to make the refractionist suspicious that correction of the eye condition will not relieve all symptoms.

Headaches may be described by the patient as sharp or dull, throbbing or boring, etc. These attacks may be periodic, occasional, or continuous. They may vary in degree and in location. They may be asso-

ciated with certain acts or conditions. They may be relieved by drugs, rest or applications. May keep one awake or disappear with sleep. The patient may wake up with it or notice it at the end of the day. The headache may be functional or organic. The functional headache is due to either a local or general derangement not producing lesions in the brain or spinal cord. The organic form is due to intercranial growths, pressure, diseased cells, etc., such as caused by tumors, syphilis, mastoid and cerebral abcesses, acromegaly, etc.

Occipital headache radiating behind the ears, down the neck and along the sciatic region, suggests a post pituitary plus condition, a functional defect. Basedow's disease, which is a pluri-glandular defect, may be initiated by headaches and insomnia. Menstrual disturbances may cause headaches especially when due to glandular dysfunction.

Headaches, mental sluggishness, symptoms for which the refractionist is frequently consulted erroneously, when present in young girls and associated with dryness of skin and hair, coldness of body, suggests hypothyroidism rather than the need of glasses.

Inability to concentrate, hypochondria, photophobia are common complaints in excess venery and onanism. These complaints occasionally coincide with those of school boys and girls brought in for glasses. Nocturnal emissions sometimes produce the same complaints. Sexual diseases and recurring pregnancy have a debilitating effect which exaggerates the discomfort produced by small errors.

Diabetes is a frequent cause of ocular complaints due to refractive changes as pointed out by Duke-Elder and others. But incipient cases often present symptoms not predicated by the error. While the diagnosis of diabetes is not expected of the refractionist, the suggestion of a thorough physical examination is always appropriate. Goiters of various types are a rich source of complaint. There may not be present any of the eye signs of exophthalmic goiter such as protrusion, convergence insufficiency and irregular winking. There may be no noticeable enlargement. There may or may not be a ravenous appetite, steady loss of weight, insomnia, loss of strength, but the nervous changes or the toxemia incidental to the disease may provoke an ocular complaint. When not predicated by error and accompanied by other symptoms, especially in women, goiter may be suspected. The disease progresses in waves of three months average and the complaints are most pronounced at the time of greater hyperthyroidism. Trying to build up convergence in

such cases is virtually useless as the writer has had the misfortune to experience.

The mechanism of headache is not well understood, but we know that headaches may be direct, reflex or both. Accommodative headaches may be dull and general, or sharp and lancinating, or may be both dull and general and sharp locally. Whereas a blow on the head, a cerebral abscess and other organic conditions will cause a dull to intense local pain at first; they may later produce an ache involving the whole head. Little can be diagnosed from the location and type of headache in comparison to its multifarious sources; we can only deal in generalities. Below is a partial list of conditions in which headaches are complained of. They are divided in functional and organic and subdivided into groups. The special sense organs complaints, are mentioned last for convenience. It will be noted that there is much similarity, even duplication in the headaches produced by various unrelated conditions.

1. RETAINED WASTE SUBSTANCES

Constipation. Headaches are usually frontal, often diffused. Inconstant and often accompanied by migraine, vertigo, somnolence.

Indigestion. Supra-orbital or frontal accompanied by eructations, occasionally pain.

Uremia. Occipital accompanied by nausea, somnolence occasionally with optic neuritis simulating brain tumor.

2. DEFECTIVE METABOLISM

Rheumatism. Due to intestinal toxemia or defective metabolism, headaches are similar to other forms of toxemia. When due to muscular rheumatism the pain is located at the occipito-frontal muscle and is made worse by manipulation of movement of the scalp. Often accompanied by articular rheumatism. May be caused by exposure to cold.

Induration headache. Occipital and radiating caused by nodular infiltrations in scalp.

Gout. In gouty intoxication due to improper oxidation, the general toxemia symptoms are also present.

Diabetes. Diabetic, similar to uremia, headache preceding coma, caused by acetone in circulation.

3. INFECTIOUS DISEASES AND THEIR TOXINS

Headaches are common early symptoms, usually frontal or generalized.

In typhoid, occipital and back of neck; in influenza and smallpox, frontal with pain in back and limbs.

4. DRUGS

Alcoholism, chronic or occasional excesses, often severe general headaches, compressing, usually on awakening. Tobacco, coffee, less commonly lead, and other chemicals; headaches are generally accompanied by nervousness. All show symptoms of digestive interference and toxemia in generalized headaches of varying severity decreasing on discontinuance and elimination of the toxic agent.

5. HYPERTHYROIDISM

Occasional headaches bilateral or unilateral, throbbing and pulsating usually accompanied by other symptoms of hyperthyroidism such as exophthalmos.

6. FOUL AIR

General constricting headaches, when due to bad air, are promptly relieved by fresh air. Individuals are found who are susceptible to reflex headaches from these causes and inside workers especially wrongly ascribe these aches to their eyes.

7. NEUROPATHIC HEADACHES

In neurasthenia, slight frontal or occipital, sensation of weight, accompanied by muscae voluntantes, increased from fatigue and decreased by rest. Mental over activity and lack of organic disease are suggestive of this rather intangible nervous disorder often used to cover up diagnostic failures.

Hysteria. Similar to neurasthenia, but often unilateral, simulating migraine and accompanied by excessive sensitivity of scalp.

Epilepsy. While not symptomatic, headaches occur frequently and when in the morning accompanied by soreness of the extremities and bed wetting suggests a nocturnal attack.

Herpes Zoster Ophthalmicus. This condition is invariably unilateral and may be accompanied or initiated by intense headaches together with extreme sensitivity of the scalp particularly on one or the other side of the head. The headache in this condition may in time become diffused, but its location and the attendant scalp sensitivity following the course of the ophthalmic branch of the fifth nerve makes its identification relatively sure. It is also often accompanied by some drooping of the lid on the side affected.

8. Circulatory headaches

Active hyperemia. The increased arterial supply due to paralysis of the vaso-constrictors of the brain causes general headaches, vertigo, insomnia, muscae volitantes, even delirium, accentuated by lowering of the head. Face and conjunctiva are red, pupils contracted, pulse strong, systolic pressure high. Headaches are common in the milder degrees. Causes: overwork, alcoholism, masturbation, sunstroke, suppressed menstruation, etc.

Passive hyperemia. Usually chronic, it produces dull general headaches and a heavy head; generally due to mechanical interference with the return of blood from the brain. May be caused by tight collar, neck growth, heart disease. Straining and stooping aggravate the headache.

Anemia. Either pernicious or due to malnutrition, the headaches are dull and diffused, frontal or general accompanied by irritability, dizziness or syncope.

9. Migraine

Definition: A paroxysmal attack of severe pain following the course of the fifth nerve. Most common in women. Often accompanied by visual disturbances. Migraine headaches are differentiated from ocular headaches in their periodical and paroxysmal character, usually confined to one side of the head and unaffected by correction of associated refractive errors. The patient usually feels well in between attacks. The cause is obscure, tendency to it is thought to be inherited. Mental fatigue seems to aggravate it, diathermy seems to help. It is often wrongly ascribed in young subjects to uncorrected refractive errors. It is often preceded by nausea, scintillation photophobia and occasionally temporary amblyopia for a short period followed by a headache lasting from a few hours to days. A hypodermic treatment is now used with some satisfactory results in certain cases.

10. Organic headaches

Under organic headaches we may class all those having their causal origin within the skull and the spinal column, excluding the orbits. Various diseases cause headaches by pressure or changes within the cranium, such as tumors, inflammation of the meninges, syphilitic lesions, etc.

Intercranial tumor. Generally very severe and constant headaches. The location of the headache does not necessarily refer to the locality of the

tumor. It is often diffused and general. The pain is aggravated by anything that interferes with cranial circulation: straining, stooping, coffee, alcohol, etc.; vomiting and choked disc, anisocoria are concomitant symptoms.

Cerebral abscess. Symptoms are similar to tumors except that pain is one on the same side and location corresponds to that of abscess. Most common form is middle ear disease.

Leptomeningitis. Inflammation of the pia mater due to an infective process: usually accompanied by signs of intercranial pressure, rigidity of neck, hyperesthesia, anisocoria.

Parenchymatous Meningitis. Inflammation of the dura mater caused by cranial injury, mastoid, syphilis, etc., headaches as in leptomeningitis usually circumscribed and confined to the side of the inflammation and accompanied by nausea and vomiting.

Intercranial syphilis. In the form of syphilitic meningitis, it produces as an early symptom a severe, at times excruciating headache in the frontal, parietal and temporal regions. It is periodic and most often occurs at night. Accompanying symptoms are mental dullness, loss of light reflex, vomiting, double optic neuritis.

Vascular disease. In arterio sclerosis of cranial arteries the headache is the same as in cerebral hyperemia (functional) mentioned previously. Syphilitic endarteritis, though the cause differs, may have the same subjective complaints. Cranial vascular changes occur mostly in chronic renal cases, rheumatism and old age.

Encephalitis. Acute inflammation of the brain produces a severe general headache involving the entire head and possibly the neck. Vertigo nausea, vomiting, general depression follow each other prior to unconsciousness. The disease is a common sequel of influenza and recoveries are frequent. Another form causes a paralysis of the eye muscles with delirium and usually terminates in death.

Mastoiditis and Sinus Thrombosis. They are due to local infections and produce headaches confined to the region of the ear, but radiating therefrom as the disease progresses.

Cranial Periostitis. Its headache is due to nodes or gummata on the exterior of the skull caused by traumatism or syphilis. The cranial bone affected is sensitive to touch and the headache may be confused with that of muscular rheumatism of the scalp.

Frontal Sinusitis. Causes a dull, intermittent local pain in the frontal region. It may also be extremely severe and general. The region is sensitive to touch, swelling is common. The pain is due to the accumulation of pus in the sinus by lack of drainage. A common complaint is that the headache appears in the morning on arising and decreases during the day. This is due to accumulations of pus in the recumbent position and drainage (relief) in the erect.

Caries of the Cervical Vertebrae. It produces a local pain radiating to the parietal and temporal regions and increased by movements of the head. The neck muscles are usually rigid.

Acromegaly. This rare disease causes a headache of the frontal and occipital regions, occasionally confined to one side. Always accompanied by visual symptoms, central scotoma, hemianopsia, optic atrophy. Supposed to be due to enlargement of pituitary body.

11. END ORGAN DYSFUNCTIONS

Auditory. Headache due to impacted wax. Local.

Naso-pharyngeal. Various headaches due to adenoids, polyps, turbinate lesions, nasal spurs, etc.; headaches of the temporal region have been known to disappear upon removal of nasal obstructions.

Teeth. Tooth decay of the upper jaw is a fairly common cause of headache, but its frequency is over-estimated by refractionists.

OCULAR HEADACHE.

Ocular headaches may be grouped in two ways: reflex from strain and direct from fatigue of the ciliary and extra ocular muscles. They may also be divided into ciliary headache and extra-ocular muscle headache. We shall exclude the pain and headache caused by inflammatory conditions within the eye and its adnexa. We may say that usually, though not invariably, we can distinguish the ciliary local headache from that of extra-ocular muscle origin, by its lancinating sharp and very local character. The most common complaint in refractive errors aside from general headache is a burning, tingling sensation in the eye as a result of close work. The pain in this case is direct and due to fatigue of the ciliary. We may say that while not proven so, it is almost invariably due to astigmatism of some sort or other. An astigmatism as low as a quarter of a diopter will cause marked complaint, whereas a hyperopia of much greater degree may not be noticed. This is so frequently apparent that we are entitled to the belief that acute ciliary pain is due to efforts at sectional accommodation. There is no question that sectional

accommodation is not only possible, but frequent. More or less positive evidence of this is found in everyday refraction. We have no proof that axial (non-astigmatic) errors cause a markedly different complaint. However, in the writer's experience, axial errors seem to cause reflex headaches rather than a local burning pain. As astigmatism is estimated to be the cause of 60 per cent of functional headaches, the statement is broad. Our inference is that a complaint of stinging pain in the eye on doing close work is most generally accompanied by some astigmatism of low degree. Whereas the pain produced by prolonged use of the ciliary in excess of the norm produces a reflex supra-orbital headache. While ciliary headaches are generally orbital they may also take place in any other part of the head according to the severity of the condition.

Pains and headaches may also be caused by defects of the extra-ocular muscles. There may be a dull local ache in excessive use of the interni or in the normal use of defectively innervated interni. The ache may be constant or intermittent and may not be relieved immediately upon cessation of close work. Reflex headache may be caused by any abnormal use of the extra-ocular muscles as in anisometropia, corrected improperly, the sudden use of correction of high degree, improper decentration of strong lenses, muscular imbalances of all kinds. One condition commonly found has been neglected, to-wit, the compensating cyclo-torsion of astigmats of asymmetrical axii near the vertical and horizontal meridians. However, as this is important enough to be treated separately, suffice it to say that it is due to a malpositioning of the axii of the correcting cylinders with respect to the error and causes a reflex headache, frontal, occipital or both, due to strain on the obliques.

It follows from the above generalizations on headaches that it is impossible to identify the cause by the location of the headache, that at best, only a clue is available.

It is also obvious that many headaches are associated; that a patient may complain of three or four different types of headaches, all of them interrelated to three or four different causes. It is obvious also that many refractive errors would not *per se* cause any complaint if it were not for some constitutional disturbance, such as toxemia, endocrine, etc., weakening the oculo-muscular tone of the patient and making the error patent. While 60 per cent of headaches are due to ocular origin, the refractionist is apt to be consulted about the 40 per cent of non-ocular origin as well, and as most people have a small manifest or

latent error, it is obvious that many corrections are unnecessarily prescribed in this manner. In many cases correction of refractive erors is useless or at best only gives slight relief. If so, what policy should be followed in handling such cases?

We may divide ocular complaints into four groups:

1. Ametropes without discomfort, but with defective vision or showing heterophoric symptoms of strain. This includes presbyopes.

2. Ametropes of relatively high error where correction is necessary irrespective of complaint.

3. Ametropes of low errors or emmetropes where the complaint is obviously due to some other cause than ocular.

4. Ametropes of low errors or emmetropes where it is difficult to judge whether the complaint is due to eyes or systemic involvements, in whole or in part.

In the first two groups, the refractionist is justified in prescribing glasses and need not be overly concerned with extra-ocular symptoms and complaints. However, a patient in the second group while needing a correction badly, may have a complaint of extra-ocular origin and the wearing of the correction may fail to give the expected relief. It is therefore necessary for the refractionist to protect himself by citing various causes of ocular complaints and thus forestalling possible disappointment. If the complaint persists an attempt should be made to discover the cause.

In the third group, glasses should not be prescribed, in the writer's judgment, as a general rule unless the patient has diagnosed himself and insists that he needs a correction. When the patient has so made up his mind, it is hard to dissuade him. But he should be warned that he may find it convenient to discard the glasses later on. However, if he is loath to wear a correction, and most people are, and merely came for honest advice, the only policy admissible is to call attention to the possible source of complaint and to refer the case to proper hands.

The fourth group of patients is the one that gives greatest concern to the conscientious refractionist. He knows that he is not justified in prescribing glasses indiscriminately and yet cannot be sure that a small correction will not relieve the complaint. A small correction often gives relief because the resultant emmetropia transfers the complaint to some other susceptible reflex area. The relief is often partial and temporary,

sometimes the complaint is made worse. Any correction prescribed for this class of patient must be tentative. In these matters, the value of cooperation with competent medical diagnosticians cannot be overestimated, for the patient's best interest and for the preservation of the refractionist's reputation.

G. L. DuPlessis.

ORGANIZATION AND JURISPRUDENCE

by Clarence W. Morris

A department in which some of the organization problems of Optometry will be discussed and in which certain of the legal aspects of refractive work will be reviewed.

A.O.A. CONGRESS AGAIN DEFEATS OPTOMETRIC PUBLIC RELATIONS PROGRAM

The defeat, at Cincinnati, of a program to establish a vigorous public relations program for optometry, marks the third consecutive year that this proposal has failed to receive adequate consideration and support. The editor of the OPTICAL JOURNAL AND REVIEW OF OPTOMETRY observes that public relations was defeated by two forces which he describes as the educational bloc and the public health group.[1] The former subscribes to an optometric philosophy which apparently refuses to recognize the dependence of optometric security upon good optometric public relations. The latter group represents substantially the same group organized to carry out this philosophy in one small portion of the field of public relations designated by the A.O.A. as "public health." The statement of certain advocates of this activity, "that there were not sufficient funds available for both public health and public relations,' signed the death warrant at Cincinnati, of a unified program of public relations for optometry.

We regret this defeat of public relations. Nevertheless, we must admire and respect the tireless energy, organization and careful planning of those who subscribe to the idea that optometric security will be attained by education and public health without any further activity in the field of public relations. These two groups possess the definitely

[1]Editorial. Optical Journal and Review of Optometry. Vol. LXXVII, No. 14, page 22, 1940.

superior advantages of excellent organization and integration which are lacking among the assets of those individuals who favor a well rounded and properly directed public relations program. The opponents of public relations have the advantage of homogenity. There are no divisions among them in respect to public relations. This gives the opponents advantages not possessed by the advocates of public relations, who are for the most part unorganized.

The final report of the A.O.A. public relations committee was a peculiar document. The report was "public relations" in name only and in substance consisted of a recommendation that some "publicity" be used. The weakness of a publicity program which is not built upon a sound program of public relations should be apparent to all optometrists. It certainly should be apparent to the educational bloc and the public health group as it is to the men who advocate a genuine program of public relations for optometry. The vulnerable weakness of the proposed publicity program has never in the past failed to draw criticism from these groups. In previous years, the technique used in defeating public relations programs for the A.O.A., consisted in confusing ordinary publicity with that specialized publicity which was based upon a thorough going program of public relations. With the confusion between the concepts of ordinary publicity and publicity based upon a public relations program, it has been possible to defeat the latter by enlarging upon the weakness of a mere publicity program. So long as this confusion could be sustained by the efforts of a portion of the optometric press, this strategy was successful. We observe, therefore, in the report of the committee on public relations, the abandonment of public relations and the sponsoring of a type of publicity which has been repudiated previously by the educational and public health groups as well as by those who advocate a program of public relations activity for the A.O.A.

Let us examine the report of the committee on Public Relations as submitted at Cincinnati. We find, (1) The amount of the program was limited to $15,000; (2) The quota for each state would be computed on the basis of $3 for each member; (3) The committee could not contract obligations for which they did not have the money at hand; (4) The committee could not start the program until $5,000 had been subscribed, and (5) the character of the program was publicity without the foundation of a sound program of public relations upon which to build. Several minor amendments were made in this report and the general subject of engaging in a public relations program was discussed by

the delegates. The contention was presented that there were not sufficient funds for both a public relations activity and a public health bureau. It was contended that either one or the other would have to be eliminated because of inadequate finances. With this concluding argument the amended public relations motion was voted down.

The responsibility for this far reaching action must therefore be placed at the door of certain A.O.A. officials, the educational bloc and the public health group. In the rapidly changing period now before us, we feel that it will become more and more obvious that optometry now needs the services of a trained public relations counselor and the program which would accompany an all inclusive bureau developed to assist the A.O.A. in this field. The failure to develop such a program belongs to these A.O.A. officials and the leaders of these groups who apparently refused to believe that optometry could support both an educational program and a public relations activity which would include work in the field of public health.

In this connection the results of Chairman Van Kirk's optometric post-card survey dealing with this question are very interesting. Nearly one-half of the members of the A.O.A. indicated that they wished the organization to engage in either a public relations program or at least a publicity program for optometry. With that fact in mind it is difficult to understand how adequate financial support for an A.O.A. public health program can be assured when such a large section of the membership of the A.O.A. has again been rebuffed by the repeated failure of that organization to adopt either a publicity or public relations program. While it is obvious to the writer that certain public health activities are fundamentally sound and merit support, it is equally obvious that a public health activity can attain its best development only when it has the support of every optometrist. The failure of the A.O.A. to adopt some program of public relations in the past has hindered, we feel, the financial development of the A.O.A. and apparently the policies of the leaders at Cincinnati have done nothing to improve the situation. One can only hope that the newly elected officers and trustees of the A.O.A. will recognize the interdependence of public health work and public relations and take appropriate steps to improve the situation during the coming years.

A study of public relations will demonstrate, beyond controversy, that public health activities will be found to be dependent upon a sound

program of public relations for their ultimate success. Public health work will progress only insofar as a sufficient number of ethical and professional optometrists are available for this work. The qualification of education alone will not be sufficient. The practitioner must practice professionally as do all professional men. One of the many activities of a public relations program would be to materially increase the number of such optometrists in actual practice. A public health program as we now have it in the A.O.A. without a corresponding agency to give the right kind of "front" or publicity to its efforts is comparable to a radio receiving set without a loud speaker. Likewise, the public health program needs the cooperation of a public relations-publicity program to complete its contribution to society. Neither public health nor publicity alone can achieve the goals we seek. When these projects and several other important optometric activities have been welded together into one integrated program the combination becomes "public relations."

PROCEDURE AND INSTRUMENTATION

By Guy L. DuPlessis

A department wherein discussions will be carried on relative to the value of various experimental and clinical techniques as employed by practicing optometrists, and also in which the instruments used by optometrists in various phases of their work, will be subjected to some critical evaluation.

A COMPLETE REFRACTIVE SERVICE

Optometry parallels dentistry in that both professions aim to render a skilled service involving among other things the preparation and dispensing of prosthetic appliances. In the case of optometry these appliances may consist of various forms of single vision spectacles, bifocals, trifocals, occupational, telescopic, ptosis spectacles and contact lenses. All this is in addition to the work involved in the examination of eyes; in the computation of special focus spectacles; in orthoptics; remedial reading treatments, and the detailed training program necessary in dealing with those suffering from sub-normal vision.

These subjects involve a high degree of technical skill on the part of the optometrist and little of his work can, in the writer's judgment, be relegated to another profession or to the dispensing optician. Technical skills in the branches of optometry above enumerated have been achieved by many optometrists, but others are content to limit themselves to the examination of the eye and the orthoptic work usually associated with an optometric practice. Refractive skill has also been acquired by some ophthalmologists, though very few, if any, have acquired proficiency in all branches of optometry.

Partly because of self-imposed limitations by optometrists, they experience at times, medical competition in the fitting of glasses. In larger centers this competition generally amounts to the examination of eyes by eye, ear, nose and throat men who have little time to devote to the solution of their patient's visual problems, and who are generally unable technically to assure themselves, or their patients, that the glasses prescribed by them are optically and aesthetically correct.

This is principally because the business of getting one's eyes examined for glasses is divided into two parts: (1) That of the examination itself, and (2) the dispensing of the needed material. Parallel this situation with a hypothetical one in dentistry, whereby dentists would confine themselves to radiology and the extraction of teeth; the treatment of pyorrhea and the practice of orthodontia, and then send the patient to a laboratory for plates, bridges, braces and other dental work. The result of this hypothetical procedure would be that the dentist would lose control of his patients, because of his self-imposed limitations and because, also, one would soon find one laboratory vying with another to capture the patient at the expense of its competitors.

However, in the eye field today we have the odd situation where one group of, for the most part, technically unqualified medical refractionists, delegate the preparation of glasses to dispensing opticians not connected with optometry. These dispensers then exploit this unique situation by a prejudicial attitude toward optometry and sometimes go so far as to make claims in advertisements of superiority of medical refractions because of the greater profits derived by them, from dealing with the latter group.

This situation has also developed a peculiar line of thought among some optometrists. These men seem to hold the opinion that there is something unprofessional about the preparation of glasses; that there is

a mercenary imputation akin to merchandising in the work of dispensing optical material to their patients. The dispensing optician, on the other hand, is not held back by such scruples and invites the public to have a medical refraction in the expectation that any dispensing of glasses involved will be his gain.

Certain optometrists have also arrived at the conclusion that the proper solution of this problem is likewise in the practice of sending their patients out of their offices for the ordering and dispensing of glasses. In so doing they hope to be relieved of the apparent merchandising problems involved in this part of the work, and of the onus of collections for the material dispensed. Incidentally they are also relieved of a substantial part of their possible profit. More important, however, than the element of profit, is the fact that in order to practice profitably under this system it is necessary to then charge a very high examination fee. While this examination fee may be justified, when added to the cost of the glasses and compared in the patient's mind to the value of the glasses, the fee may be thought excessive. More important still is the fact that under this dispensing arrangement, contacts with the patient are rare, and the obligation of maintenance of comfortable and efficient seeing is relegated to one who is more interested in selling a new frame than in the actual welfare of the patient. The personal relationship of the refractionist to the patient is more or less lost, or at least discouraged under this plan and the ultimate control of the patient is very apt to be lost.

The writer's thesis is this: There is nothing base or objectionable about the preparation and dispensing of glasses. The optometrist, because of his background and his special training, is better qualified than any other to exercise close supervision on the manufacturers who make the material in the first place and the laboratories who assist in processing it. He too can supervise better than any one else the dispensing of the material to his own patients.

In special cases the optometrist can devise special types of glasses without relying upon the advice of unqualified persons. He is, if he does his own dispensing, the master of the situation and is at all times in absolute control of his practice. As a professional man he should be the sole judge and arbiter on the use of materials for his patient's best interest, and he should not be subjected to undue sales pressure for the adoption and use of any particular type of materials. The medical pro-

fession and the dental profession are frequently appealed to by manufacturers of products to verify the manufacturers' claims of superiority: "Ask your dentist about this tooth paste," "Six out of ten physicians prescribe this cod liver oil." The medical profession and the dental group both have technical committees to review and pass on the merits of advertised products. Why should not optometry do the same? Inasmuch as most optometrists do dispense material to their own patients, they have the right to assist in judging the qualities of these materials but if they stop using them they would soon lose whatever control they now exercise in this direction.

The abandonment of dispensing by optometrists is, in my judgment, a tacit admission of inferiority. The medical refractionist is justified in outside dispensing assistance because of his lack of knowledge of the subject, but this is not the case with the optometrist who is familiar with this phase of the work because of his thorough training in all refractive matters.

In an effort to further professionalize optometry, certain issues have been confused. Professional conduct does not refer to the preparation and dispensing of glasses to one's own patients, any more than the preparation and dispensing of a plate is unprofessional on the part of the dentist. Rather, it is the over-emphasis on material to the detriment of refractive service that may prove harmful. A normal balance between the two must be maintained. In this respect it is possible in the future that optometry may be harmed by an over-emphasis on the side of the dispensed material itself. We must remember that our patients do not wear glasses for adornment. The aesthetic consideration is still secondary to the patients ocular and neurological need for glasses. The emphasis in some quarters during recent years on the design of the material in frames, for instance, has resulted in a marked increase in the cost of these frames to the optometrist, without a corresponding increase being possible in the fees he receives for this material. This has had a tendency to reduce the professional service fee and in spite of this reduction in service fees has not made the total fee more justifiable in the eyes of many of our patients.

To sum up, there can be no compromise with a solution of this problem. Optometric service consists in the recognition of pathologic conditions, in the correction of functional disturbances by orthoptics or prosthetic appliances. Orthoptics should be under the exclusive con-

trol of optometrists who do this work. The preparation and dispensing of glasses for this patient should be under the sole and exclusive control of the optometrist. Only thus can the public be assured of undivided responsibility in these services, and only thus can the optometrist fully justify his fee for services. His fee should be for a complete service involving the examination of eyes, the preparation and dispensing of appliances. His responsibility begins when the patient presents himself for an examination and continues for as long as the patient is under his care.

If dispensing responsibility is to be relegated to a trade, other optometric practices may soon be invaded and lost to optometry.

Remedial reading even now is a subject under study in the teaching profession. Orthoptics is becoming a lay practice in England. The optometric field, though limited, is one requiring much skill. This field should be jealously guarded against encroachments and the best insurance against encroachments is the adequate rendering of a complete service by all optometrists to their patients. Responsibility cannot be divided and the performance of special services cannot be relegated to lay persons by optometrists.

PSEUDO ESOPHORIA AND CONJUNCTIVAL IRRITATION DUE TO OVER USE OF ANTISEPTIC EYE SOLUTION

Patient, Mrs. I. S. Occupation, clerk. Age 28. Came in with the complaint of occasional blurring of vision, morning secretion and general eye discomfort. External examination revealed marked circum-corneal injection. Pupillary reactions normal. Ophthalmoscopy negative. Static Skiametry indicated that the patient accepted the following correction. O.D. +0.25 D.Cyl. axis 90. O.S. —0.25 D.Sph. Uncorrected visual acuity O.D. 22/25. O.S. 20/22. Subjective findings same as static skiametry. Dynamic findings normal. Subjective positive accommodation —2.75 D.Sph. Distance phoria 16△ esophoria. Near-point phoria 2△ esophoria.

The case history revealed that the patient had lost her mother two weeks ago and at first, as was natural, had been doing much crying. There was a temporary emotional upset but at the time the case was first seen the patient had entirely regained her normal self-control. During the early period of grief, however, the patient had started using a

saturated solution of boric acid to relieve, if possible, the redness of the lids and had also used an inexpensive protection glass to hide the appearance of the eyes. This antiseptic solution was used many, many times each day and when the case was first seen was still in use, now, not because of the effects of crying, but rather because of the morning secretion and the general feeling of irritation in and around the eyes themselves.

The refractive findings indicated the possibility of a slight spasm of accommodation, but before adopting any remedial measures, the patient was asked to wait for a few days and during that period to discontinue the wearing of the protection glass and to reduce the use of the antiseptic solution to a maximum of twice a day or less. Three days later the patient returned with the report that her eyes looked and felt fine. Her esophoria at a distance had decreased to 1△ and there was no esophoria at the near-point. Vision too had improved and the case was dismissed at this point.

This report is presented to indicate how easy it is to draw false conclusions from data obtained in a routine eye examination. Undoubtedly due to excessive lachrymation at the time of her mother's death, the patient noticed the inflamed condition of her eyes and the slight discharge and began strenuously using a saturated solution of boric acid. The continuous and excessive use of this antiseptic solution brought on the inflammation whose irritation reflexly may have produced the 16△ of esophoria evidenced in the patient's first visit. The protection glasses that she had used during each day at work did not improve the condition as they were of poor quality and neutralized about —0.12 D. Sph., but these protection glasses were, in the writer's judgment, not the primary cause of the disturbance. Various examination procedures would label this case as a type requiring further and elaborate care, when in reality the whole syndrome was caused by the use of a local irritant generally considered harmless.

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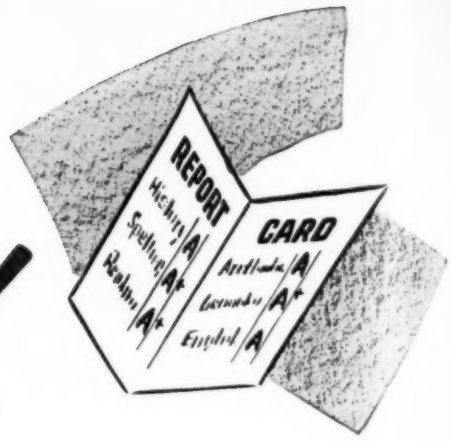

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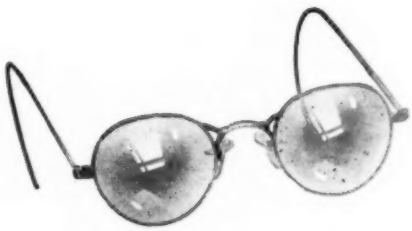

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